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## A REVISION OF THE GENUS *PRIVA*<sup>1</sup>

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### HISTORY OF THE GENUS

The tropical genus *Priva* was established by Adanson<sup>2</sup> in the 'Familles des Plantes' in 1763. The genus was segregated from *Verbena* on account of the characters of the fruit and was based on a single species, namely, *Verbena lappulacea*, published by Linnaeus<sup>3</sup> in the 'Species Plantarum' in 1753.

Jussieu<sup>4</sup> in 'Observations sur la Famille des Plantes Verbenacees,' published in 1806, accepted Adanson's genus *Priva* and transferred thereto several species, including *P. dentata*, *P. echinata*, *P. hispida*, *P. laevis*, and *P. leptostachya*. In the following year Persoon<sup>5</sup> gave a brief synopsis of the genus, recognizing the five species listed by Jussieu, but made no further additions to the group.

Humboldt, Bonpland and Kunth,<sup>6</sup> in 1817, added a new species, *P. aspera*, from material collected in Mexico. During the following three decades five additional species were described by different authors. They were *P. crenata*<sup>7</sup> Schrad., *P. Forskalii*<sup>8</sup>

<sup>1</sup> An investigation carried out at the Missouri Botanical Garden in the Graduate Laboratory of the Henry Shaw School of Botany of Washington University and submitted as a thesis in partial fulfillment of the requirements for the degree of master of science in the Henry Shaw School of Botany of Washington University.

<sup>2</sup> Adanson, Fam. Pl. 2: 505. 1763.

<sup>3</sup> Linnaeus, Sp. Pl. ed. 1. 28. 1753.

<sup>4</sup> Jussieu, Ann. Mus. Paris 7: 70. 1806.

<sup>5</sup> Persoon, Syn. Pl. 2: 139. 1807.

<sup>6</sup> HBK, Nov. Gen. & Sp. 2: 278. 1817.

<sup>7</sup> Schrader, Linnaea 8, Litteratur Bericht: 24. 1833.

<sup>8</sup> Jaubert & Spach, Ill. 5: 59, pl. 455. 1842.

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Jaub. & Spach, *P. orchoides*<sup>1</sup> Walp., *P. trachelioides*<sup>2</sup> Mart. & Gal., and *P. lamiifolia*<sup>3</sup> Mart. & Gal. Thus in Walpers' 'Repertorium Botanices Systematicae,' published in 1844-1847, more or less complete descriptions were given for ten recognized species.

The first comprehensive monographic treatment of the genus *Priva* was by Schauer<sup>4</sup> in De Candolle's 'Prodromus' in 1847. In this treatment several previously published species were reduced to synonymy and one new species, *P. bahiensis* DC. from Brazil was described. Since 1847, although several species, namely, *P. tuberosa*<sup>5</sup> and *P. armata*<sup>7</sup> Watson, *P. portoricensis*,<sup>8</sup> and *P. domingensis*<sup>9</sup> Urban have been published, yet no comprehensive study of the group as a whole has been made.

During recent years the numerous botanical expeditions, particularly to the West Indies, Central and South America, have resulted in the accumulation of a comparatively large representation of many of the smaller genera. In organizing the material of the small genus *Priva* in the herbarium of the Missouri Botanical Garden, although a relatively large number of specimens was available for study, yet considerable difficulty was met in the identification of species as well as in the determination of the proper specific names to be used. Hence the present investigation was undertaken to determine the limitation and geographical distribution of species and to establish the correct names to be used.

#### GENERAL MORPHOLOGY

*Roots.*—The root system in the genus *Priva* presents comparatively little variation. Most of the species develop a rather persistent, more or less branched tap-root. *P. rhinanthifolia* with

<sup>1</sup> Walpers, Rep. 4: 36. 1844-1848.

<sup>2</sup> Mart. & Gal. Bull. Acad. Brux. 11<sup>2</sup>: 324. 1844.

<sup>3</sup> *Ibid.* Bull. Acad. Brux. 11<sup>2</sup>: 324. 1844.

<sup>4</sup> Walpers, Rep. 4: 34. 1844-1848; and 6: 687. 1846-1847.

<sup>5</sup> Schauer in DC. Prodr. 11: 533. 1847.

<sup>6</sup> Watson, Proc. Am. Acad. 18: 135. 1882-1883.

<sup>7</sup> *Ibid.* Proc. Am. Acad. 25: 160. 1890.

<sup>8</sup> Urban, Symb. Ant. 4: 534. 1903.

<sup>9</sup> *Ibid.* Symb. Ant. 7: 354. 1912.

distinctly tuberous roots is a notable exception, and constitutes therefore an outstanding element in the genus.

*Stems.*—The stem is typically that of an herbaceous perennial with a woody base. There is considerable variation in size, however, from the low, more or less decumbent stem of *P. rhinanthifolia* to the stout, erect stem of *P. aspera* which grows to a height of 18 decimeters. The stem may be simple or branched. In the case of *P. armata*, the branching is from the base and is usually arcuous-ascending. In all cases the stem is square and often somewhat furrowed or slightly striated.

*Leaves.*—The variation of the leaf characters within the genus is very great. There is a gradation in length from 1.5 centimeters, as found in *P. portoricensis*, to that of 10 centimeters, as shown by *P. aspera*. The general outline of the leaf, in the majority of species, is more or less of the ovate, subcordate type. *P. rhinanthifolia* presents the only exception. In this species the outline of the leaf is distinctly oblong. All the species have leaves which are quite regularly dentate and pubescent; in some cases, however, the pubescence is strigose. Both petiolate and sessile leaves occur, with the former type the more common.

*Inflorescence.*—The inflorescence is a spicate raceme throughout the whole genus, varying greatly, however, in length. In the majority of cases the flowers are pedicellate and solitary. The length and the curvature of the pedicel are important points in the delimitation of the species within the genus.

*Calyx.*—In antithesis variation in the calyx is not very marked. The persistent calyx, however, presents characters most helpful for specific determination. The calyx may be inconspicuously lobed and thus terminate rather abruptly, or it may be distinctly lobed and the lobes contorted, coarctate, and decidedly beaked. The pubescence, usually present and of straight or uncinate-hispid hairs, plays an important role in classification.

*Corolla.*—The corolla, in most cases, is deciduous and slightly bilabiate. The tube shows diversity in that it may barely exceed the calyx in length, or it may be two or three times as long. Some instances show the tube and throat to be pubescent but in most cases pubescence is absent.

*Stamens.*—The stamens are didynamous, inserted at unequal

levels in the corolla-tube and included or nearly so. The latero-anterior pair is more highly developed and inserted a little above the middle of the tube. The two smaller latero-posterior stamens are inserted approximately at the middle of the tube. The posterior stamen is rudimentary or entirely lacking. The anthers are two-celled and the cells are parallel or slightly divergent.

*Pistil*.—The pistil is typically bicarpellate throughout the whole genus with an ovary which, in the majority of cases, is two-celled. *P. mexicana* and *P. aspera* possess a one-celled ovary, due to the abortion of the posterior cell. The style is included and usually glabrous. The stigma is two-lobed, the posterior lobe, which is somewhat reduced, is tooth-like, while the anterior lobe is club-shaped.

*Cocci*.—The cocci, although varying considerably in shape and size, furnish relatively constant specific characters which aid greatly in specific diagnosis. The dorsal surface may be echinate or ridged. In the latter case the fruit is usually ovate. The commissural surface may be excavated, margined, plane or nearly so. The cocci in most cases are two-celled and two-seeded.

#### GEOGRAPHICAL DISTRIBUTION

The genus *Priva* is essentially a tropical genus. The majority of species are found between 30° N. and 35° S. latitude. Of the eleven recognized species, nine occur exclusively in the western hemisphere, while the other two are found in the eastern hemisphere only. Two species are confined to South America. *P. bahiensis* is known only from Brazil, while the range of *P. cuneato-ovata* does not seem to extend north of Argentina and Chili. The species *P. rhinanthifolia*, *aspera*, and *mexicana* are indigenous to Mexico and Central America.

The only species found in the United States is the type species, *P. lappulacae*, which is rather cosmopolitan in tropical America.

The African species, *P. leptostachya*, seems to offer the greatest problem in distribution. It is possible, however, that this species as here interpreted may be too inclusive; but the material at hand is inadequate, lacking either foliage, flowers, or fruit to permit of satisfactory or final treatment. A survey of the ma-



terial at hand, however, shows the distribution of this species to extend from the island of Socotra south to, and including, Cape Colony.

The geographical distribution of the genus, as well as the distribution of individual species, is indicated in pl. 1.

#### ACKNOWLEDGMENTS

The writer wishes to take this opportunity to express his appreciation and gratitude to the several people who have made the present study possible. Thanks are due Dr. George T. Moore, Director of the Missouri Botanical Garden, for the use of the excellent library and herbarium facilities which this institution affords. Sincere appreciation is due Mr. W. R. Maxon, of the United States National Herbarium, Dr. B. L. Robinson, of the Gray Herbarium, and Mr. D. C. Davies, Director of the Field Museum, who so willingly loaned material from the above-mentioned herbaria, and to Professor J. Paul Goode, of the University of Chicago, for permission to use his Homolosine Equal Area Projection Map No. 101 HC. Especial thanks are due to Dr. J. M. Greenman, Curator of the Herbarium of the Missouri Botanical Garden, under whose guidance this revision has been completed, for the aid and advice which were so willingly given at all times.

#### ABBREVIATIONS

The abbreviations used, to indicate the herbaria in which the specimens cited in the present paper occur, are as follows: C = University of Chicago Herbarium (deposited in the Field Museum); F = Field Museum of Natural History Herbarium; G = Gray Herbarium of Harvard University; M = Missouri Botanical Garden Herbarium; US = United States National Herbarium.

#### TAXONOMY

*Priva* Adans. Fam. Pl. 2: 505. 1763; Persoon, Syn. Pl. 2: 139. 1807; Schauer in DC. Prodr. 11: 532. 1847; Bocquillon, Rev. Verb. 115. 1861-1863, excl. *Dipyrena*; Bentham & Hooker, Gen. Pl. 2: 1145. 1873-1874; Briquet in Engl. & Prantl, Nat.

Pflanzenfam. IV. Abt. 3a, 155. 1897; Lam, Verb. Malayan Arch. 23. 1919.

*Blairia* Houst. ex Linn. Gen., ed. 1, 334. 1737.

*Phryma* Forsk. Fl. Aegypt. Arab. 115. 1775, not L.

*Streptium* Roxb. Pl. Corom. 2: 25. t. 146. 1798.

*Tortula* Roxb. ex Willd. Sp. Pl. 3: 359. 1800.

*Pitraea* Turcz. in Bull. Soc. Nat. Moscow 35<sup>2</sup>: 328. 1862.

*Phelloderma* Miers in Trans. Linn. Soc. London 27<sup>2</sup>: 100. 1870.

Herbaceous caulescent perennials, glabrous or pubescent. Leaves opposite, sessile or petioled, membranaceous, dentate. Inflorescence spicate, terminal or axillary. Flowers small, solitary, and axillary. Bracts small, lanceolate to ovate. Calyx tubular in anthesis, 5-ribbed, terminating in 5 short teeth, persistent, enlarging with and investing the fruit, usually contracted at the orifice at maturity. Corolla-tube cylindrical; limb spreading, oblique, slightly bilabiate. Stamens 4, didynamous, adnate to about the middle of the corolla-tube, included or nearly so; anther cells parallel or slightly divergent; posterior stamen or staminode much reduced, minute or absent. Ovary 2-celled; ovules 2 or by abortion 1; stigma 2-lobed; posterior lobe tooth-like, anterior lobe club-shaped. Fruit included in the enlarged calyx, separating at maturity into 2-celled (or by abortion 1-celled) cocci. Pericarp hard; dorsal surface echinate, ridged, or smooth; commissural surface excavated, concave, or plane.

Type species: *P. lappulacea* (L.) Pers. Syn. Pl. 2: 139. 1807.

#### KEY TO THE SPECIES

- A. Dorsal surface of cocci distinctly echinate.
- B. Fruiting calyx uncinately hispid.
  - C. Leaves sessile.....1. *P. curtisiae*
  - CC. Leaves petioled.
    - D. Leaves ovate, .5-3 cm. long, .3-2 cm. wide; fruit strongly contracted at the base.
      - E. Inflorescence 10-25 cm. in length.....2. *P. portoricensis*
      - EE. Inflorescence 6 cm. or less in length.....3. *P. domingensis*
    - DD. Leaves ovate, 1.5-10 cm. long, 1-6 cm. wide; fruit not strongly contracted at the base.
      - F. Commissural surface of cocci excavated; corolla at least twice the length of the calyx.
        - G. Corolla-tube spirally contorted in bud.....4. *P. leptostachya*
        - GG. Corolla-tube not contorted in the bud.....5. *P. bahiensis*

- FF. Commissural surface of cocci flat or slightly furrowed; corolla slightly exceeding the calyx.....6. *P. lappulacea*  
 BB. Fruiting calyx more or less hirsute, not uncinat-hispid.....7. *P. armata*  
 AA. Dorsal surface of cocci smooth or furrowed, not echinate.  
 H. Stem and leaves glabrous or somewhat puberulent; South American species.....8. *P. cuneato-ovata*  
 HH. Stem and leaves more or less hirsute; Mexican species.  
 I. Leaves sessile, oblong, sharply dentate toward the apex.  
     9. *P. rhinanthifolia*  
 II. Leaves petioled, ovate, subcordate, uniformly dentate.  
 J. Fruiting calyx hirtellous with occasional uncinat hairs intermixed, beaked, erect.....10. *P. aspera*  
 JJ. Fruiting calyx densely uncinat-hispid, not beaked, reflexed.  
     .....11. *P. mexicana*

### 1. *Priva Curtisiae* Kobuski, n. sp.<sup>1</sup>

Herbaceous perennial; stem erect or somewhat decumbent, quadrangular, pubescent, striate, branched, 30–50 cm. high; leaves sessile, ovate to oblong, 0.5–4.5 cm. long, 0.5–2.5 cm. broad, obtuse at the apex, truncate or nearly so at the base, crenate-serrate, scabrous above, paler and somewhat pubescent beneath; inflorescence terminal, spicate, racemes 8–24 cm. long, loosely flowered, pedunculate; bracts ovate to lanceolate, 1–2 mm. long, covered with a fine pubescence; calyx tubular in anthesis, 5–7 mm. long, teeth short, obtuse, fruiting calyx subglobose, 5 mm. in diameter, densely pubescent with uncinat-hispid hairs intermingled with a straight pubescence, basal portion dilated, enclosing the fruit, apical portion somewhat connivent at the orifice; corolla white, 8–10 mm. long, tube spirally twisted, limb slightly bilabiate, lobes rounded; fruit consisting of 2 bilocular cocci, dorsal surface convex, covered with many stout, pubescent spines, commissural surface deeply excavated, margined.

<sup>1</sup> *Priva Curtisiae* sp. nov., herbaceis perennis; caule erecto vel plus minusve decumbente, ramoso, 30–50 cm. alto, quadrangulare, pubescente, striato; foliis sessilibus, ovatis vel oblongis, 0.5–4.5 cm. longis, 0.5–2.5 cm. latis, obtusis, basi truncatis vel subcordatis, crenato-serratis, supra scabris, subtus pallioribus et hirsuto-pubescentibus; inflorescentiis terminalibus, spicato-racemosis, 8–24 cm. longis, pedunculatis, floribus remotis, pedicellis 1–3 mm. longis; bracteis ovatis vel lanceolatis, 1–2 mm. longis, tenuiter pubescentibus; calyce anthesi tubulosi, 5–7 mm. longo, lobis subobsoletis, calyce fructifero subrotundo, inflato 5 mm. diametro, apice connivente; corolla alba, 8–10 mm. longa, spiraliter contorta, limbo parve bilabiato, lobis rotundatis; capsula late ovata vel subrotunda, matura septicide secedens in coccois duos; coccis bilocularis, dorso convexo grosse multisque pubescentibus spinosis testis; commissura coccorum alte excavata marginata.

Distribution: Kenya Colony, British East Africa.

Specimens examined:

British East Africa: in dry, light soil, Loito Plains, Kenya Colony, 1500-2100 m. alt., 6 June 1923, *Curtis 499* (G, TYPE, M, fragment and photograph); hillside in hard, dry soil, open to sun, Loito Plains, Kenya Colony, 1500-2100 m. alt., 28 June 1923, *Curtis 597* (G); Loito Plains, Kenya Colony, 1500-2100 m. alt., 3 July 1923, *Curtis 642* (G); in wet soil, but after rain usually dry, Mau Range, Kenya Colony, 1500-2100 m. alt., 31 May 1923, *Curtis 472* (G).

This species is related to *P. leptostachya* Juss. but differs in having sessile leaves, and evenly echinate and uniformly larger fruit. The species is dedicated to *Mrs. Anita Grosvenor Curtis*.

2. *Priva portoricensis* Urban, Symb. Ant. 4: 534. 1903.

A slender, branched perennial 30-40 cm. high; stem woody below, puberulent; leaves petiolate, deltoid to ovate, 0.5-3 cm. long, 0.3-1.5 cm. broad, somewhat crenate-serrate, acute to obtuse at the apex, nearly truncate at the base, pubescent; racemes 25 cm. or less in length; pedicels 1-1.5 mm. long; calyx 5 mm. long, covered with dense minute hairs, lobes triangular; fruiting calyx somewhat rotund; corolla pale blue, tube 6 mm. long, rising well above the calyx, slightly amplified at the throat, lobes obovate-rotund; fruit cuneate or obcordate, strongly contracted at the base; cocci bearing two rows of spines on the dorsal surface, 2-celled, commissural surface excavated.

Distribution: Porto Rico.

Specimens examined:

PORTO RICO: in thickets near Guanica, 2 Feb. 1886, *Sintenis 3597*, CO-TYPE (US, G).

3. *Priva domingensis* Urban, Symb. Ant. 7: 354. 1913.

Stem 10-20 cm. high, branched below, branches glabrous or sparingly pubescent; leaves petiolate, ovate, 5-15 mm. long, 4-8 mm. wide, truncate at the base and somewhat decurrent on the petiole, obtuse to rotund at the apex, often shortly apiculate, crenate, or rarely subentire, finely pubescent; racemes 6 cm. or less in length with a peduncle 1-3 cm. long; flowers few, 2-5,

pedicels 1.5 mm. long; calyx 5 mm. long, covered with sparse short hairs intermixed with dense hooked hairs, lobes short, widely triangular; corolla violet-red, 11.5 mm. long, nearly twice as long as the calyx, somewhat amplified above, lobes rounded.

Distribution: San Domingo at La Vuelta, near the river Las Lavas, in lime hills.

No specimens seen. Description translated from the original.

4. *Priva leptostachya* Juss. Ann. Mus. Paris 7: 70. 1806; Pers. Syn. Pl. 2: 139. 1807; Walpers, Rep. 4: 35. 1844; Schauer in DC. Prodr. 11: 532. 1847; Bocquillon, Rev. Verb. 116. 1861-1863; Clark in Hooker, Fl. Brit. Ind. 4: 565. 1885; Pearson in Fl. Capensis 5: 206. 1901; Lam, Verb. Malayan Arch. 24. 1919.

*Tortula aspera* Roxb. in Willd. Sp. Pl. 3: 359. 1801.

*P. dentata* Juss. Ann. Mus. Paris 7: 70. 1806; Pers. Syn. Pl. 2: 139. 1807; Schauer in DC. Prodr. 11: 533. 1847.

*P. abyssinica* Jaub. & Spach. Ill. Pl. Orient. 5: 58. t. 453. 1853-57.

*P. Forskalii* Jaub. & Spach. Ill. Pl. Orient. 5: 59. t. 455. 1853-

--- Mev. Comm. Pl. Afr. Austr. 1<sup>2</sup>: 75. 1837.

--- Orient. 5: 57. 1853-57.

--- stem 4-sided,

coarsely cre-

at the base, strigosely pubes-

terminal or axillary, elongate, 2-3 dm. long, ---

shortly pedicellate; calyx in anthesis cylindrical, 3-lobed

in fruit globose, uncinately hispid; corolla white, bilabiate, twice as long as the calyx, twisted in anthesis; fruit ovate, obcordate, hard, glabrous or sometimes pubescent, composed of two slightly coherent 2-celled cocci, longitudinally ridged with two rows of short spines, commissural surface deeply excavated.

Distribution: in grassy plains and river banks, Island of Socotra to South Africa, India, and East Indies.

Specimens examined:

AFRICA: Island of Socotra, Feb.-March 1880, Balfour 542 (G)

Distribution: Kenya Colony, British East Africa.

Specimens examined:

British East Africa: in dry, light soil, Loito Plains, Kenya Colony, 1500-2100 m. alt., 6 June 1923, *Curtis 499* (G, TYPE, M, fragment and photograph); hillside in hard, dry soil, open to sun, Loito Plains, Kenya Colony, 1500-2100 m. alt., 28 June 1923, *Curtis 597* (G); Loito Plains, Kenya Colony, 1500-2100 m. alt., 3 July 1923, *Curtis 642* (G); in wet soil, but after rain usually dry, Mau Range, Kenya Colony, 1500-2100 m. alt., 31 May 1923, *Curtis 472* (G).

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### ERRATA, VOL. XIII, NO. 1

Page 9, line 21, for *Forskaolaei*, read *Forskaolii*; for 75, read 275.

throat, lobes obovate-rotund; fruit cuneate or obcordate, strongly contracted at the base; cocci bearing two rows of spines on the dorsal surface, 2-celled, commissural surface excavated.

Distribution: Porto Rico.

Specimens examined:

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*P. Forskalii* Jaub. & Spach. Ill. Pl. Orient. 5: 59. t. 455. 1853-57.

*P. Forskaolaei* E. Mey. Comm. Pl. Afr. Austr. 1<sup>o</sup>: 75. 1837.

*P. Meyeri* Jaub. & Spach. Ill. Pl. Orient. 5: 57. 1853-57.

An herbaceous perennial 3-9 dm. high, branched; stem 4-sided, striate; leaves petiolate, ovate, 2-11 cm. long, 1-5 cm. wide, coarsely crenate-serrate, rounded or obtuse at the apex, cuneate at the base, strigosely pubescent on both surfaces; racemes terminal or axillary, elongate, 2-3 dm. long; flowers many, distant, shortly pedicellate; calyx in anthesis cylindrical, 3-6 mm. long, in fruit globose, uncinat-hispid; corolla white, bilabiate, twice as long as the calyx, twisted in anthesis; fruit ovate, obcordate, hard, glabrous or sometimes pubescent, composed of two slightly coherent 2-celled cocci, longitudinally ridged with two rows of short spines, commissural surface deeply excavated.

Distribution: in grassy plains and river banks, Island of Socotra to South Africa, India, and East Indies.

Specimens examined:

AFRICA: Island of Socotra, Feb.-March 1880, Balfour 542 (G)

doubtfully referred to this species; vicinity of Kampala, on the trail from Entebbe, Victoria Nyanza to Butiaba, Albert Nyanza, Uganda, 650–1110 m. alt., 21–22 Dec. 1909, *Mearns 2402* (US); Ripon Falls, Uganda Protectorate, 18 July 1913, *Dümmer 30* (US); Nyasaland, Rhodesia, 1891, *Buchanan 887* (US); Mozambique, exact locality and date of collection lacking, *Howard 118* (US); River Shire, British Nyasaland Protectorate, coll. of 1863, *Kirk* (G); Durban, Union of South Africa, March 1894, *Kuntze* (US, 633155); in fields and mountains near Enon, South Africa, 450 m. alt., *Drege a* (M); in woods, Somerset, Cape Colony, 750 m. alt., March 1886, *Bolus 306* (F); exact locality and date of collection lacking, *Burchell 3625* (G); Boschberg, 900 m. alt., without date, *MacOwan* (F).

EAST INDIES: locality and date not indicated, probably collected by Wallich (M, 119874).

ASIA: in the locality of Maisur and Carnatic, British India, without further data, *Thomson* (G).

5. *Priva bahiensis* DC. Prodr. 11: 533. 1847.

Stem quadrangular, narrow, branched, 1.5–3 dm. high, finely pubescent; leaves shortly petiolate, ovate, subcordate, 2.8–4 cm. long, 1–2 cm. wide, coarsely serrate, narrowed at the base into the petiole, strigosely pubescent above, finely pubescent beneath; racemes terminal, 2 dm. long, flowers solitary, in the axils of the bracts, distant; bracts 3–4 mm. long, about twice as long as the pedicels, somewhat linear, pubescent; calyx slender, tubular, 5-ribbed, densely uncinat-hispid, especially between the ribs, 4–5 mm. long, accrescent, becoming broadly inflated, globose, splitting in halves, connivent at the orifice; corolla twice the length of calyx; fruit obcordate, attenuate at base, splitting into 2 bilocular cocci at maturity, dorsal surface convex, possessing two rows of long, slender, curved spines, transversely ridged between the two rows of spines, commissural surface excavated and margined.

Distribution: eastern Brazil.

Specimens examined:

BRAZIL: along fences and near water, Province of Bahia, *Salzmann* (M, 118802).

6. *Priva lappulacea* (L.) Pers. Syn. Pl. 2: 139. 1807; Kuntze, Rev. Gen. Pl. 2: 509. 1891; Rusby, Bull. Torr. Bot. Club 27: 80. 1900; Urban, Symb. Ant. 4: 534. 1903; Britton, Fl. Bermuda, 313. 1918; Britton & Millsp. Bahama Fl. 367. 1920; Urban, Symb. Ant. 8: 597. 1921.

*Verbena lappulacea* L. Sp. Pl. 28. 1753.

*Priva echinata* Juss. Ann. Mus. Paris 7: 70. 1806; Kunth, Syn. Pl. Aeq. 2: 61. 1823; Walpers, Rep. 4: 34. 1844-1847; Schauer in DC. Prodr. 11: 534. 1847; Bocquillon, Rev. Verb. 116. 1861-1863; Griseb. Fl. Br. W. Ind. 492. 1864; Griseb. Cat. Pl. Cubensis, 215. 1866; Gray, Syn. Fl. N. Am. 2<sup>1</sup>: 324. 1878; Small, Fl. Southeastern U. S., ed. 2, 1013. 1913.

*P. lamiifolia* Mart. & Gal. Bull. Acad. Brux. 11<sup>2</sup>: 325. 1844.

Stem erect, simple or branched, quadrangular, 2-6 dm. high, pubescent; leaves petiolate, ovate, subcordate, 2.5-11 cm. long, 1-6 cm. wide, coarsely dentate, slightly acuminate at the apex, truncate to subcordate at the base, strigosely pubescent; racemes loosely flowered, 8-18 cm. long; flowers pedicellate; calyx in anthesis tubular, 2-3 mm. long, densely uncinat-hispid, fruiting calyx broadly ovate, coarctate at the apex; corolla slightly surpassing the calyx, blue, pink or white, salverform, oblique, slightly bilabiate, 5-lobed, lobes small, rotund; fruit consisting of 2 bilocular cocci, quadrangular, dorsal surface echinate, scrobiculate between the spines, commissural surface plane or nearly so.

Distribution: cosmopolitan weed of tropical America and the West Indies; in sandy soil, along railroad tracks, open fields, and rocky places.

Specimens examined:

UNITED STATES:

FLORIDA: Key West, Aug. 1877, Garber (US, G); Key West, date lacking, Blodgett (US, G); Key West, 1874, Ed. Palmer 395 (C, US, M); exact locality lacking, coll. of 1842-1849, Rugel (M).

MEXICO:

LOWER CALIFORNIA: San José del Gabo, 15 Sept. 1890, Brandegee (US, G).

TAMAULIPAS: vicinity of Victoria, 320 m. alt., 1 May-13 June 1907, Ed. Palmer 502 (US, G, and F); near Tampico, 15 m. alt., 1-31 Jan. 1910, Ed. Palmer 8 (G, US, M).

SINALOA: Culiacan, 1891, *Ed. Palmer* (US); Culiacan, 12 Oct. 1904, *Brandeggee* (US); Culiacan, 27 Aug.-15 Sept. 1891, *Ed. Palmer 1458* (G); foothills of Sierra Madre, near Colomas, 21 July 1897, *Rose 3240* (US); foothills of Sierra Madre, near Colomas, 16 July 1897, *Rose 1722* (US); rancho del Agua Fria, San Ignacio, 430 m. alt., 12 June 1918, *Montes 389* (US); dry hills near Mazatlan, 30 March 1910, *Rose 13711* (US).

JALISCO: Manzanillo, 1-31 Dec. 1890, *Ed. Palmer 1007* (US).

COLIMA: coffee plantation northwest of Colima, 540 m. alt., 28 July 1905, *Goldsmith 89* (G).

GUERRERO: Iguala, 10-12 Aug. 1905, *Rose 9419* (US); vicinity of Acapulco, Oct. 1894-Mar. 1895, *Ed. Palmer 551* (F, G, US, C, M).

VERA CRUZ: near Tantoyuca, prov. Huasteca, 1858, *Ervendberg 148* (G); sandy soil by Rio de Santa Maria, Zacuapan, Aug. 1906, *Purpus 2009* (G); Vera Cruz, 12 March 1910, *Orcutt 2999* (F, M); in dry sunny places near fences, 17 March 1857, *Mohr* (US).

OAXACA: Tuxtepec, 90 m. alt., 24 Aug. 1895, *L. C. Smith 647* (G).

CAMPECHE: Canasayal, 20 m. above Chanpotan River, 12 Dec. 1900, *Goldman 458* (F).

YUCATAN: Izamal, coll. of 1888, *Gaumer* (F); Merida, 24 Nov. 1864, *Schott 22, 23* (F); Buena Vista, 21 June 1892, *Gaumer* (F); open places, Casa de las Monjas, 20 March 1903, *Seler 3995* (G, F); Chicankanab, 1895, *Gaumer 394* (F) *364* (US, F, G, M).

COZUMEL: center of Island, 20 Feb. 1899, *Millsbaugh 1548* (F).

CENTRAL AMERICA:

BRITISH HONDURAS: without exact locality, coll. of 1905-1907, *Peck 293* (G).

GUATEMALA: Puerto Barrios, 2 April 1922, *Greenman 5978* (M); Puerto Barrios, Dept. de Izabal, sea level, 2-6 June 1922, *Standley 24795* (US); Quirigua, Dept. de Izabal, 75-225 m. alt., 15-31 May 1922, *Standley 23762* (US); clear places, Chama, Alta Verapaz, 270 m. alt., 8 June 1920, *Johnson 211* (US); eastern Verapaz and Chiquimla, 1885, *Watson 346, 3732* (G); Santa Barbara, Dept. of Solola, 415 m. alt., Aug. 1891, *Shannon 247* (US); Santa Rosa, 900 m. alt., July 1892, *Heyde & Lux 3017* (G).

EL SALVADOR: Ahuachapan, Dept. of Ahuachapan, 800–1000 m. alt., 9–27 Jan. 1922, *Standley 19749* (US); vicinity of Sonsonate, Dept. de Sonsonate, 220–300 m. alt., 18–27 March 1922, *Standley 22003* (US); Santa Emilia, Sonsonate, 135 m. alt., 22–25 March 1922, *Standley 22097* (US); Acajutla, Sonsonate, 30 m. or less alt., 20 March 1922, *Standley 21905* (US); Ateos, Dept. de la Libertad, 17 April 1922, *Standley 23339* (US); San Salvador, April 1905, *Velasco 8854* (G); dry thicket, San Miguel, Dept. de San Miguel, 110 m. alt., 24–27 Feb. 1922, *Standley 21114* (US).

NICARAGUA: open ground near Chinandega, 21 Jan. 1903, *Baker 754* (US); Granada, 25 Feb. 1903, *Baker 166* (G, M).

COSTA RICA: along railroad tracks near Moin Junction, 1 Sept. 1919, *Rowlee 505* (US); Hacienda de Guacimo, date and collector's name lacking, *United Fruit Co. 71* (US).

PANAMA: vicinity of Cristobal, Colon, 5 Jan.–22 Feb. 1923, *Broadway 67* (G, US); Bocas del Toro, 6 Feb. 1921, *Carleton 147* (G).

#### WEST INDIES:

BAHAMAS: Governors Harbor, Eleuthera, 14 Dec. 1890, *Hitchcock* (F, M); Governors Harbor, Eleuthera, 19–20 Feb. 1907, *Britton & Millspaugh 5534* (F); Nassau, New Providence, 6 Jan. 1903, *Curtis 24* (F, G, US, M); waste places, Nassau, New Providence, 9 Sept. 1904, *Britton & Brace 655* (F); Nassau, New Providence, 13 Jan. 1905, *Wight 40* (F, G); New Providence, 15 July, 1879, *Brace 23* (F); coppice, near Nicholl's Town, northern section of Andros, 4–5 Feb. 1910, *Small & Carter 8928* (F); open ground near lighthouse, Watling Island, 13 March 1907, *Britton & Millspaugh 6616* (F); sandy soil between dunes, Parrot Cay, Caicos Group, 3 March 1911, *Millspaugh 9196* (F); Inagua, 3 Dec. 1890, *Hitchcock* (F, M).

CUBA: in thickets near trail, Sierra Mendoza, Prov. of Pinar del Rio, 25 Dec. 1911, *Shafer 11144* (US, F); Santiago, Prov. of Havana, 10 April 1904, *Van Hermann 113* (F); Cienfuegos, Prov. Santa Clara, 24 June 1895, *Combs 220* (F, C, G, M); Ingenio Soledad, Cienfuegos, Prov. Santa Clara, 24 Jan. 1903, *Pringle 9* (G, US); waste places, La Gloria, Camaguey, 30 Jan. 1909, *Shafer 128* (F); forests about Paso Estancia, Oriente, 27 April 1909, *Shafer 1576* (US); San Juan Hill, Santiago, 2 Feb. 1899,



*Millspaugh 1043, 1048* (F); Santiago, 15-18 Feb. 1902, *Pollard & Palmer 329* in part (F).

HAITI: vicinity of Etroite, Gonave Island, 15-21 March 1920, *Leonard 3302* (US); vicinity of Pikmi, Gonave Island, 5-9 July 1920, *Leonard 5124, 5229* (G, US); Guayubin, Monte Cristi, 100 m. or less alt., 13-21 Feb. 1921, *Abbott 1026* (US); waste and cultivated ground, Anse Gallette, Gonave Island, 3-14 March 1920, *Leonard 3101* (US); St. Marc, sea level, 25-28 Feb. 1920, *Leonard 2943* (G, US); Puerto Frances, Samana Peninsula, sea level to 200 m. alt., 28-29 March 1921, *Abbott 1200* (US); Samana Peninsula, sea level to 200 m. alt., 30 Dec. 1920, *Abbott 498* (US); Hispaniola, Puerto Plata, 26 April 1906, *Raunkiaer 869* (US); Haina, July 1921, *Faris 303* (US); railroad, Pimental, Prov. Pacificador, 20-25 Jan. 1921, *Abbott 641, 648* (US); sandy loam, open hilltops, July 1921, *Faris 324* (US); Barahona, April 1911, *Fuertes 386* (US); locality lacking, Jan.-March 1871, *Wright, Parry & Brummel 354* (US).

PORTO RICO: Santurce, 8 Nov. 1899, *Goll 68* (US); Camuy, 21 June 1901, *Underwood & Griggs 201a* (US); Santa Anna, 9 Nov. 1899, *Goll 150* (US); Cantano, 6-11 Jan. 1899, *Millspaugh 337* (F); near hot springs, Coama, 1 July 1901, *Underwood & Griggs 529* (US); open fields, Coama Springs, 22 Nov. 1899, *Goll 675* (US); Mayaguez, 11 Jan. 1884, *Sintenis 157* (G); Adjuntas Road, seven miles from Ponce, 2 Dec. 1902, *Heller 6181* (G, F, M); roadside near Isabel Segunda, Vieques Island, 24-27 Jan. 1914, *Shafer 2425* (US); locality lacking, 1899, *Heller 149* (F).

GRAND CAYMAN: Spot Bay, 13-14 Feb. 1899, *Millspaugh 1286* (F); Jan. 1890, *Hitchcock* (M).

JAMAICA: rocky bank at roadside in vicinity of Montego Bay, 28-30 March 1920, *Maxon & Killip 1605* (US, G); woods near Port Antonio, 29 June 1897, *Fredholm 3081* (US); Port Antonio, 28 Jan.-6 Feb. 1899, *Millspaugh 921* (F); Porus, Jan. 1892, *Lloyd 1104* (F, M); Ferry River on Spanish Town road, sea level, 24 May 1904, *Maxon 2180* (US); along railroad between Kingston and Gregory Park, sea level, 22 Feb. 1920, *Maxon & Killip 313* (US); dryish situation near Kingston, 28 April 1903, *Maxon 1657* (US); streets in Kingston, 9 Dec. 1890, *Hitchcock* (M); Public Gardens, Hope Grounds, Kingston, 210 m. alt., 13 Nov. 1914,



*Harris 11796* (F, US, C, M); open railroad embankment at St. Margaret's Bay, Nov. 1900, *Millspaugh 1910* (F); on Windward Road, 27 Aug. 1902, *Harris* (F); King's House, *Campbell 6785* (F); locality lacking, Dec. 1869, *Alexander* (F, US, G).

ST. JAN: rocky hillside, Lamosure, 10–12 Feb. 1913, *Britton & Shafer 507* (US).

LESSER ANTILLES: near Bassin Yard, St. Croix, Dec. 1895, *Ricksecker 167* (F, G, US, M); near Bassin Yard, St. Croix, 17 Feb. 1897, *Ricksecker 131* (F, US, M); St. Thomas, Dec. 1886, *Eggers* (F); among fields in St. Thomas, Jan. 1887, *Eggers 26* (US); St. Thomas, Dec. 1880, *Eggers 365* (G); St. Thomas, *Ehrenberg 107* (M); St. Thomas, *Krebs* (F); roadside at Kinsale, Montserrat, 22 Jan. 1907, *Shafer 138* (F); Martinique, date lacking, *Sieber 316* (M); Barbados, coll. of 1900, *Botanic Station Herbarium 139* (F, G, US); roadside ditch, St. Vincents, March 1890, *Smith 714* (G); in cocoa fields, Grenada, Oct. 1904, *Broadway* (G, F); St. Georges, Grenada, 26 Oct. 1904, *Broadway* (US, M); Government House, Tobago, 19 Nov. 1913, *Broadway 4845* (US); bank of saddle road, Trinidad, 28 Feb. 1920, *Britton & Hazen 162* (US, G).

SOUTH AMERICA:

COLOMBIA: Santa Marta, 30 m. alt., Nov. 1898–1901, *Smith 1465* (F, G, US, M); Santa Marta, 75 m. alt., Nov. 1898–1901, *Smith 545* (F, G, US, M); Boco Verde, on Rio Sinu, Cacaolate, Dept. of Bolivar, 90–120 m. alt., 13–14 Feb. 1918, *Pennell 4198* (US, G).

VENEZUELA: Margarita Island, 9 July 1901, *Miller & Johnston 96* (F, G, US, M); Sacuapana, April 1896, *Rusby & Squires 306* (F, G, US, M); near colony of Tovar, 16 Aug. 1855, *Fendler 912* (G).

BRITISH GUIANA: Promenade Gardens, Georgetown, 30 Oct.–1 Nov. 1919, *Hitchcock 16593* (US, G); weed in the field, Mahaica, on coast, 20 miles east of Georgetown, 15 Nov. 1919, *Hitchcock 16773* (G, US).

FRENCH GUIANA: grassy places, Cayenne, 2 May 1921, *Broadway 89* (US, G).

ECUADOR: Caragues Bay, 17 June 1923, *Anthony and Tate 118* (US); occasional in shady places around 300 m. alt., on Charles

Island, Galapagos Islands, 28 Feb. 1905, *Stewart 3312* (G, US, M).

PERU: sandy roadside, La Merced, 600 m. alt., 10-24 Aug. 1923, *Macbride 5296* (F); locality and date lacking, *Ruiz 4785* (US).

BOLIVIA: junction of the rivers Beni and Madre de Dios, Aug. 1886, *Rusby 1784* (F, US, G); Guanai-Tipuani, Apr.-June 1892, *Bang 1375* (F, G, US, M).

7. *Priva armata* Watson, Proc. Am. Acad. 25: 160. 1890.

A low slender herb, 3 dm. or less high, much branched from the base, lower branches often arcuate-ascending; stem slender, square, more or less pubescent; leaves sessile, ovate, 10-15 mm. long, 6-7 mm. broad, irregularly toothed, acute at the apex, pubescent; spikes few-flowered, short; bracts broadly ovate, spatulate, rough, hispid, 4-5 mm. long; calyx tubular, finely pubescent, accrescent, at maturity subglobose, 8-10 mm. long, loosely inclosing the fruit, thin, membranaceous; fruit hard, consisting of two bilocular cocci, dorsal surface covered with stout straight spines, commissural surface flat.

Distribution: near Monterey, Mexico.

Specimens examined:

MEXICO: Valley of Monterey, 7 July 1889, *Pringle 1931* (G, TYPE, F); Valley of Monterey, 18 July 1889, *Pringle 2674* (M, C).

8. *Priva cuneato-ovata* (Cav.) Rusby, Bull. Torr. Bot. Club 27: 80. 1900.

*Castelia cuneato-ovata* Cav. Anal. Cienc. Nat. Madrid 3: 134. 1801; Ic. and Des. Pl. 6: 60. t. 583. 1801.

*Priva laevis* Juss. Ann. Mus. Paris 7: 70. 1806; Pers. Syn. Pl. 2: 139. 1807; Walpers, Rep. 4: 36. 1844-1847.

*Verbena tuberosa* R. Graham, Edinb. N. Phil. Jour. 29: 174. 1840.

*Priva orchiodoides* Walpers, Rep. 4: 36. 1844-1847.

*Bouchea copiapensis* Gay, Hist. Nat. Chile 5: 26, Atlas 1, pl. 55. 1849.

Stem simple or branched, 3-4.5 dm. high, 4-angled, lower branches often arcuate-ascending, glabrous or very slightly

pubescent; leaves petiolate to nearly sessile, ovate to subrotund, 3–8 cm. long, 1–4 cm. broad, coarsely mucronate-serrate to crenate, acute to obtuse at the apex, attenuate at the base into a petiole, glabrous or somewhat puberulent; racemes terminal, flowers distant, opposite or distinctly verticillate, shortly pedicellate; bracts lanceolate, acuminate, 4–7 mm. long; calyx pubescent, 10–12 mm. long, folded, with long acuminate lobes, tips of calyx lobes involute, hyaline-margined, more or less contorted over the fruit at maturity; corolla bluish-red, tube pubescent, spread of limb approximately equaling the length of the calyx-tube; fruit included within the persistent calyx, ovate, 4–5 mm. long, 2–3 mm. wide, splitting at maturity into two bilocular cocci, dorsal surface of individual coccus convex, somewhat longitudinally ridged, commissural surface flat.

Distribution: moist places, Argentina and Chile.

Specimens examined:

SOUTH AMERICA:

ARGENTINA: Territorio del Chaco, 9 April 1918, *Jørgensen 2480* (G, US, M); Dept. Andalgalá, Prov. de Catamarca, 16 Sept. 1918, *Jørgensen 1022* (G, US, M); Córdoba, Nov. 1892, *Kuntze* (F).

CHILE: along irrigating ditches and in moist places, Tacna Arica region, 20 April 1922, *Shepard 269* (US); Vallenar, Prov. Atacama, 300 m. alt., 1 Feb. 1923, *Werdermann 137* (M); Santiago, Jan. 1919, *Bro. Claude-Joseph 735* (US); Santiago, Jan. 1919, *Bro. Claude-Joseph 804* (US); without exact locality, Oct. 1914, *Buchtien 4381* (US).

9. *Priva rhinanthifolia* (Mart. & Gal.) Robinson, n. comb.

*Verbena rhinanthifolia* Mart. & Gal. in Bull. Acad. Brux. 11<sup>2</sup>: 323. 1844.

*Priva tuberosa* Watson, Proc. Am. Acad. 18: 135. 1883.

Roots tuberous; stems branched at the base, erect or decumbent, 4-angled, hairy, 5–30 cm. long; leaves sessile, oblong, 1.5–4 cm. long, 0.5–1 cm. broad, coarsely toothed, especially toward the apex, somewhat narrowed at the base, more or less strigosely pubescent on the upper surface, sometimes uniformly, often in patches, pubescence prominent on the under surface, especially along the midrib and veins; racemes extremely short and few-

flowered; bracts lanceolate, pubescent, 4–5 mm. long; calyx unequally and deeply 5-lobed, conspicuously pubescent, becoming 8–9 mm. long, somewhat accrescent, more or less constricted over the cocci at maturity; corolla exceeding the calyx-tube, pubescent; fruit somewhat globose, consisting of two bilocular cocci which are irregularly and coarsely reticulated, not spiny.

Distribution: central and southern Mexico.

Specimens examined:

MEXICO:

CHIHUAHUA: Parral, 1800 m. alt., 19 Sept. 1898, *Goldman 103* (US); oak woods and plains near Cosihuiriac, 27 Aug. 1887, *Pringle 1549* (G, C); under oaks, hills near Cosihuiriac, 19 Sept. 1888, *Pringle 3057* (F).

DURANGO: Otinapa, 25 July–5 Aug. 1906, *Ed. Palmer 396* (M, G); city of Durango, 1 Aug. 1898, *Nelson 4635* (F, G, US); grassy sides of ravines at Santiago Papasquiara, Apr.–Aug. 1896, *Ed. Palmer 424* (F, G, M).

SAN LUIS POTOSI: in the mountains near San Miguelito, 1876, *Schaffner 713* (C).

HIDALGO: calcareous soil near Tula, 2640 m. alt., 25 July 1898, *Pringle 7586* (G, F).

JALISCO: road between Huejuquilla and Mesquite, 25 Aug. 1897, *Rose 3576* (US).

MEXICO: Teoloyucan, 11 Aug. 1913, *Salazar* (US); vicinity of Tlalnepantla, 6 July 1905, *Rose 8422* (US); near Guadalupe, Valley of Mexico, 1905, *Rose 8511* (US); San Angel, Valley of Mexico, 1865–1866, *Bourgeau 357* (G, US); San Angel, Valley of Mexico, 15 Aug. 1905, *Rose 9496* (US).

MICHOACAN: Punguato, 2100 m. alt., 20 June 1912, *Arsène 8296* (US); grassy hills near Patzcuaro, 19 July 1892, *Pringle 4147* (C, F, G, M); Lama Santa Maria, 1950 m. alt., 14 June 1909, *Arsène 3499* (US).

10. *Priva aspera* HBK. Nov. Gen. & Sp. 2: 278. 1817; Walpers, Rep. 4: 34. 1844; Schauer in DC. Prodr. 11: 534. 1847; Engl. & Prantl, Nat. Pflanzenfam. 4: Abt. 3a, 155. 1895.

*Priva trachelioides* Mart. & Gal. in Bull. Acad. Brux. 11: 324. 1844.

*Priva Orizabae* Watson, Proc. Am. Acad. 23: 282. 1888.

Stem erect, 12–18 dm. high, branched; branches four-sided, striate, pubescent; leaves petiolate, ovate, 6–20 cm. long, 3–10 cm. wide, crenate, acuminate, acute at the base, scabrous above, pale beneath, reticulately veined, nerves and veins rather prominent beneath; racemes terminal, solitary or in threes, 15–45 cm. long; bracts lanceolate, 1–2 mm. long; flowers solitary, distant; pedicels stout, 1.5–2 mm. long; calyx tubular in flower, lobes involute, hyaline-margined, sparsely pubescent, in some instances pubescent with both straight and uncinata hairs, globose in fruit, sulcate; corolla bilabiate, slightly exceeding the calyx, tube pubescent, throat hairy; fruit inclosed in the persistent calyx, erect, consisting of two 1-celled cocci, dorsal surface convex, reticulately ridged, without spines, commissural surface oblique, excavated.

Distribution: Mexico and Central America.

Specimens examined:

MEXICO:

CHIHUAHUA: Santa Eulalia Mts., 8 Sept. 1885, *Pringle 287* (G, C, F, US, M); Sierra Madres near Seven Star Mine, 2100 m. alt., 15 Sept. 1899, *Townsend & Barber 422* (G, F, US, M); Sierra Madre Mts. in Guayanopa Canyon, 1080 m. alt., 24 Sept. 1903, *Jones 7323* (G).

SAN LUIS POTOSI: near San Luis Potosi, 1800–2400 m. alt., 1787, *Parry & Palmer 713* in part (M).

SINALOA: Santa Lucia, Sept. 1919, *Dehesa 1644* (US); in thickets along the Rio Fuerte, near San Blas, 24 March 191–, *Rose 13371* (US).

TEPIC TERRITORY: 5 Jan.–6 Feb. 1892, *Ed. Palmer 1999* (G, F, US).

JALISCO: Guadalajara, July–Oct. 1886, *Ed. Palmer 500* (G, US).

VERA CRUZ: moist rocky slopes, Zacuapan, Sept. 1906, *Purpus 1921* (F, G, M); Zacuapan, Sept. 1917, *Purpus 8054* (G, US, M); Mt. Orizaba, 1865–1866, *Bourgeau 2950* (G, US); near Orizaba, 1200 m. alt., July 1891, *Seaton 465* (G); Orizaba, 25 Sept. 1865–1866, *Bourgeau 3118* (G); Orizaba, without date, *Botteri 593* (G).

MICHOACAN: vicinity of Morelia: northwest of Punguata, 570

m. alt., Sept. 1900, *Arsène* (US, M); Rincon, 1950 m. alt., 21 Aug. 1922, *Arsène* 8696 (F, US, M); Rincon, 1900 m. alt., 8 Sept. 1910, *Arsène* 5292 (G, US, M); Rincon, 1850 m. alt., 19 Sept. 1909, *Arsène* 2545 (US); Rincon, 1950 m. alt., 25 July 1909, *Arsène* 2796 (G, M); 2000 m. alt., 9 Nov. 1909, *Arsène* (US); Morelia, Apr. 1909, *Arsène* 45 (F).

OAXACA: Rancho de Coldevin, 1650 m. alt., 10 Sept. 1894, L. G. Smith 160 (G).

CENTRAL AMERICA:

GUATEMALA: Coban, Dept. Alta Verapaz, 1350 m. alt., Sept. 1907, von Türckheim 1628 (G); coll. of 1892, Heyde 206 (US).

COSTA RICA: locality and date lacking, Kuntze (F).

11. *Priva mexicana* (L.) Pers. Syn. Pl. 2: 139. 1807.

*Verbena mexicana* L. Syst. 66. 1784; Willd. Sp. Pl. 1: 116. 1797.

*Zapania mexicana* Lam. Ill. Gen. 1: t. 17, f. 1. 1823; Poir. Dict. 8: 845. 1808.

*Blairia mexicana* Gaertn. Fruct. 1: 265. t. 56. 1787.

*Priva hispida* Juss. Ann. Mus. Paris 7: 70. 1806; Walpers, Rep. 4: 34. 1844; Schauer in DC. Prodr. 11: 534. 1847.

(?) *Priva crenata* Schrad. Ind. Sem. Hort. Götting, 1831; Linnaea 8, Litteratur-Bericht: 24. 1833.

Stem erect, simple or branched, quadrangular, striate, 3-12 dm. high, more or less pubescent; leaves short-petiolate or sessile, ovate, subcordate, 2-8 cm. long, 1-5 cm. broad, somewhat crenate-dentate, acute at the apex, subcordate at the base, strigosely pubescent on the upper surface, pale beneath; racemes terminal or axillary, pedunculate, erect or subflexuous, 5-30 cm. long; bracts lanceolate, usually longer than the pedicels; pedicels very minute, 0.5-1 mm. long; calyx in flower cylindrical, densely uncinat-hispid, fruiting calyx globose, close-fitting, connivent at orifice, 2-parted, splitting at maturity of fruit; corolla usually twice the length of the calyx, lilac; fruit consisting of 2 unilocular cocci, reflexed, convex on the dorsal surface, reticulately ridged, without spines, commissural surface somewhat concave on either side of a persistent longitudinal median ridge, smooth, not margined.



Distribution: Mexico.

Specimens examined:

CHIHUAHUA: shaded ravines and mesas near Cosihuiriachic, 28 Aug. 1887, *Pringle 1354* (G, US, F).

COAHUILA: Saltillo, Sept. 1898, *Ed. Palmer 281* (G, US, M).

DURANGO: near the city of Durango, Apr.-Nov. 1896, *Ed. Palmer 578* (G, F, US, M); Ramos Inde, 11-14 Aug. 1898, *Nelson 4709* (US).

NUEVO LEON: Monterey, 800 m. alt., Aug. 1911, *Abbon 6178* (US).

SAN LUIS POTOSI: Minas de San Rafael, July 1911, *Purpus 5518* (G, F, US, M); region of San Luis Potosi, 1800-2400 m. alt., 1878, *Parry & Palmer 713* (G, F, M, US).

HIDALGO: Zimapan (fide Hemsley), date lacking, *Coulter 1141* (G); near Tequixquiac, 30 Aug. 1903, *Rose 6642* (US); hills near El Salta, 2100 m. alt., 17 Sept. 1901, *Pringle 9287* (G, F, M).

MEXICO: Mexico City, Apr.-Nov. 1896, *Ed. Palmer 578* (M); Mixcoac, Federal District, 11 Aug. 1913, *Arsène 8808* (US); Mixcoac, Federal District, 11 Aug. 1913, *Arsène 8508* (F, M); Tlalpam, Federal District, 1910, *Orcutt 3628* (US, F, M); Valley of Mexico, 18 June 1865, *Bourgeau 359* (G); Valley of Mexico, 1875, *Schaffner 425* (G).

PUEBLA: vicinity of Puebla: 2170-2270 m. alt., 27 Oct. 1907, *Arsène 1195* (US); Mayorazzo sier l'Atayac, 2120 m. alt., 4 July 1907, *Arsène 1340* (US); Cerro Tepaxuchil, 2330 m. alt., 11 July 1907, *Arsène 10207* (US); Cerro Tepaxuchil, 2330 m. alt., 14 Nov. 1908, *Arsène 7054* (US); Santa Barbara, 2150 m. alt., 20 June 1910, *Nicolas & Arsène 5280* (US, M); San Luis Tultitlanapa, July 1908, *Purpus 3524* (F).

OAXACA: Valley of Oaxaca, 1550 m. alt., 21 July 1897, *Gonzalez 290* (G); near Cuicatlan, 750-1200 m. alt., 24 Oct. 1894, *Nelson 1822* (US, G).

MICHOACAN: vicinity of Morelia: Lorna Santa Maria, 1950 m. alt., 28 Aug. 1910, *Arsène* (US, M); Jaripeo, 2100 m. alt., 13 July 1911, *Arsène* (G, US, M).

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- Abbon, 6178 (11).  
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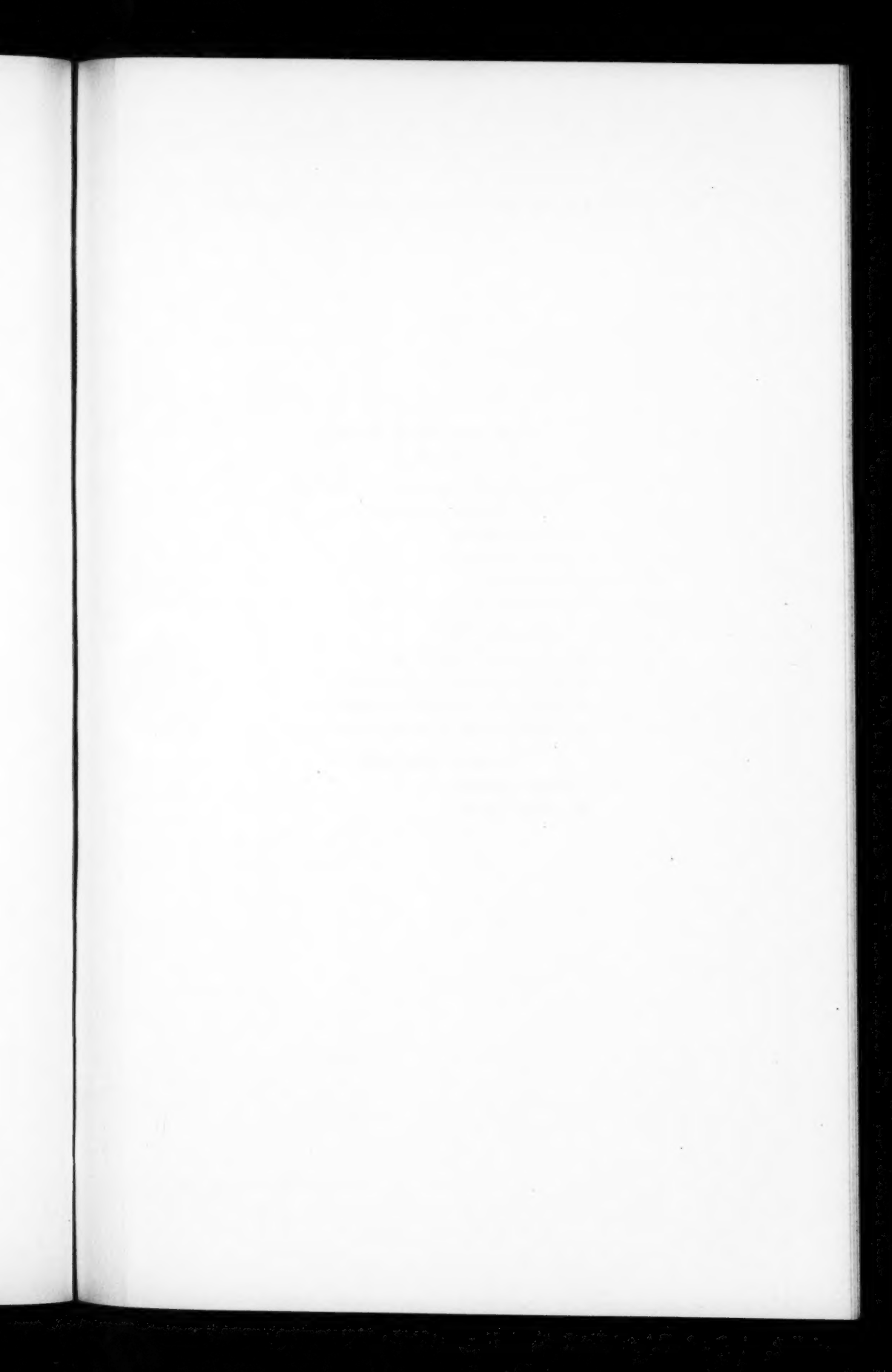
- Orcutt, C. R. 2999 (6); 3628 (11).  
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## EXPLANATION OF PLATE

## PLATE 1

Geographical distribution of the genus *Priva*.

## WESTERN HEMISPHERE

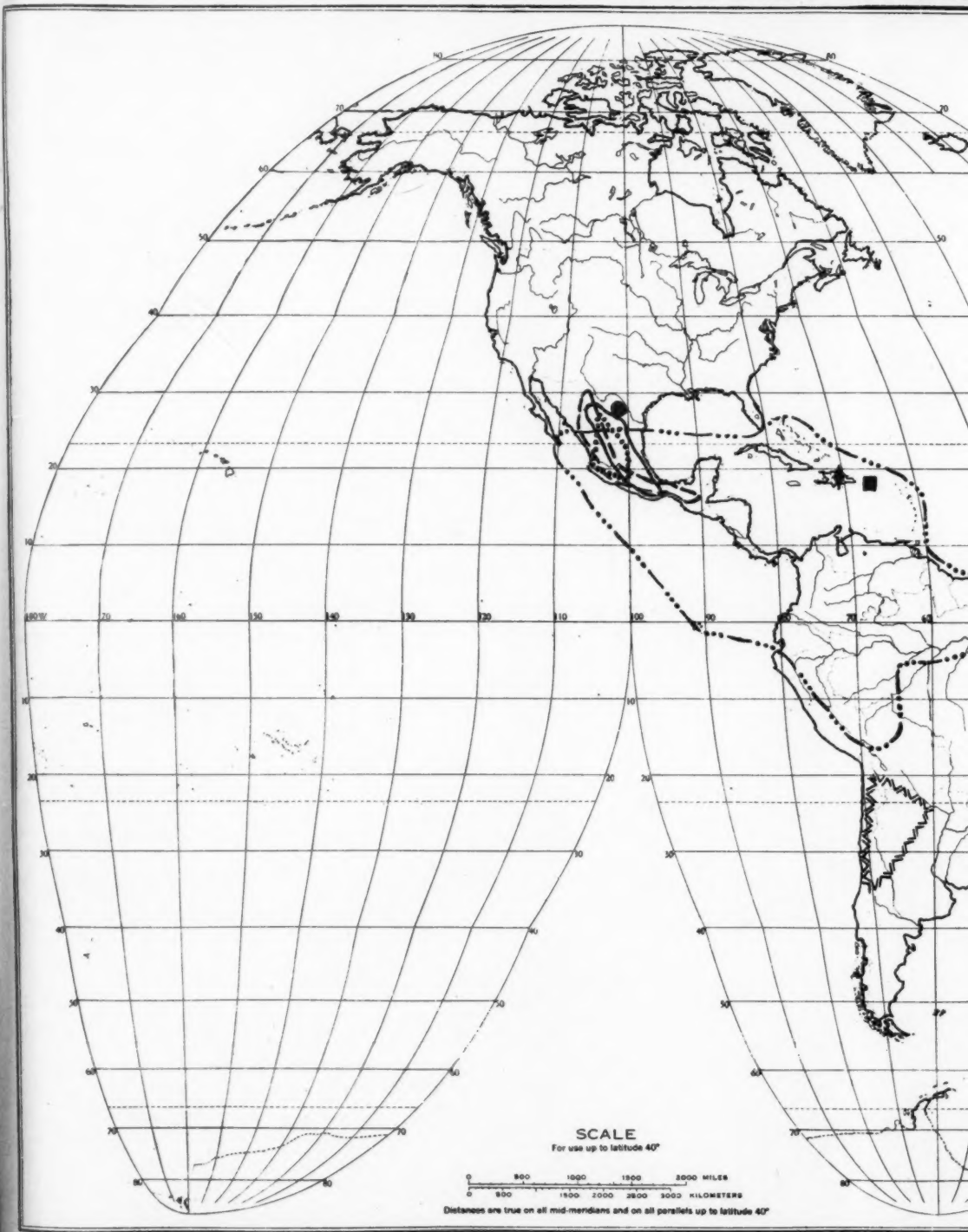
- ..... = *Priva lappulacea*.  
 ————— = *Priva mexicana*.  
 - - - - - = *Priva aspera*.  
 ^^^^^^^^^ = *Priva cuneato-ovata*.  
 ..... = *Priva rhinanthifolia*.  
     ● = *Priva armata* (in Mexico).  
     ◆ = *Priva domingensis* (in West Indies).  
     ■ = *Priva portoricensis* (in West Indies).  
     ▲ = *Priva bahiensis* (in South America).

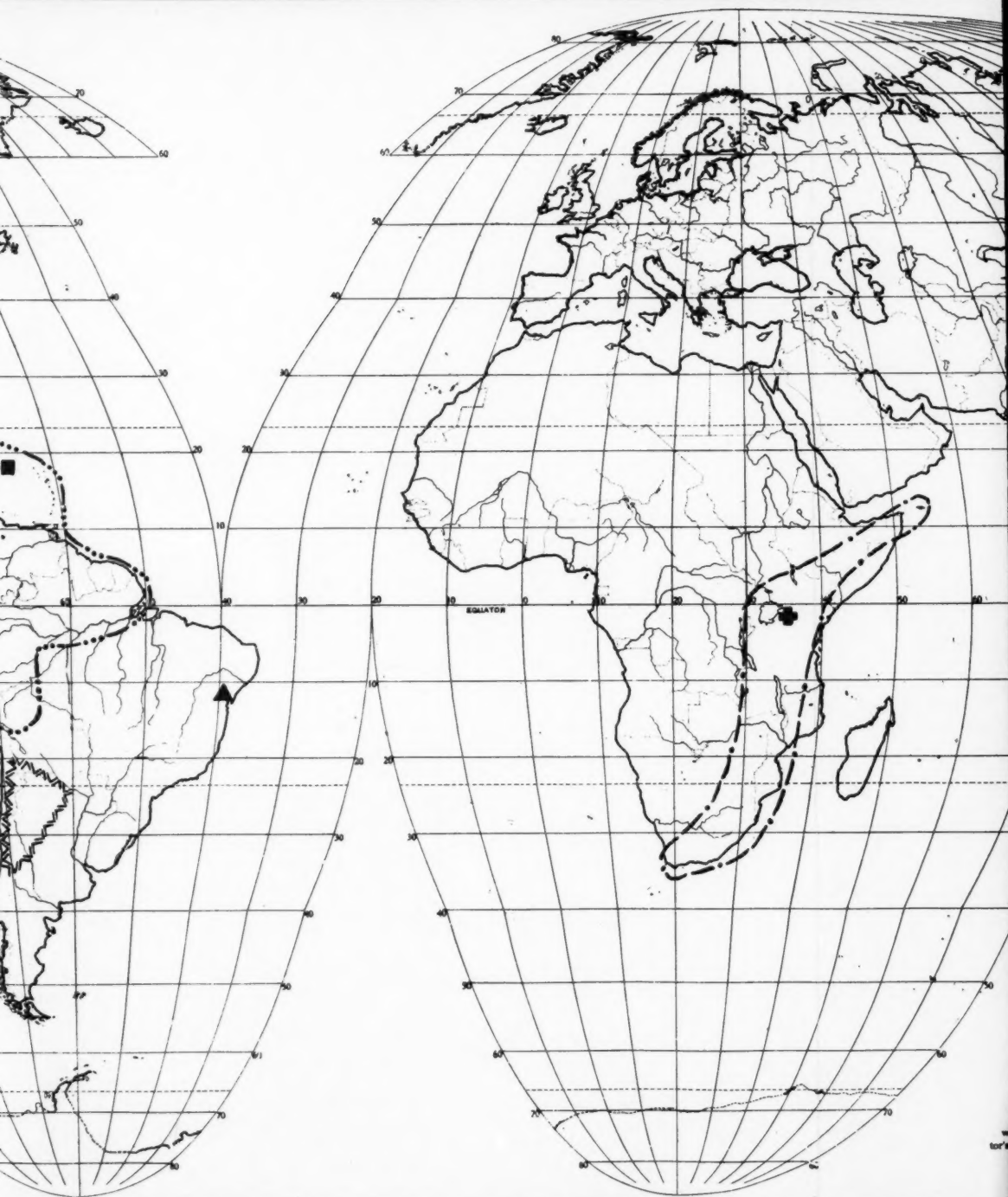
## EASTERN HEMISPHERE.

- - - - - = *Priva leptostachya*.  
     ✚ = *Priva Curtisiae*.

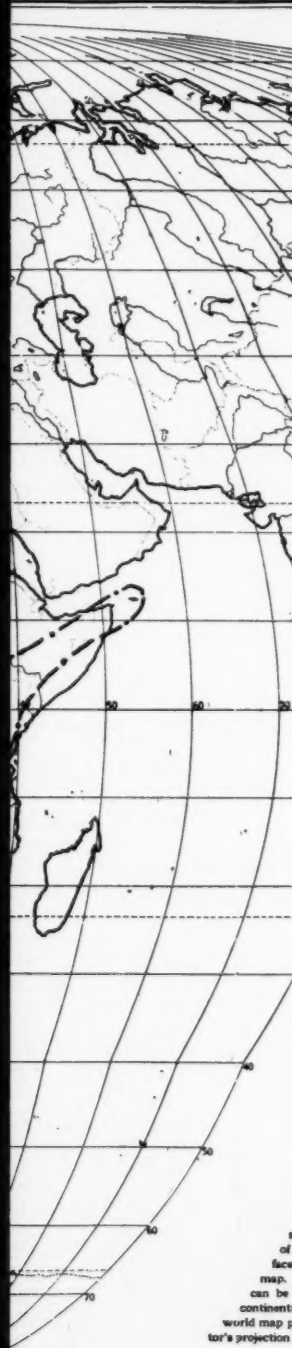








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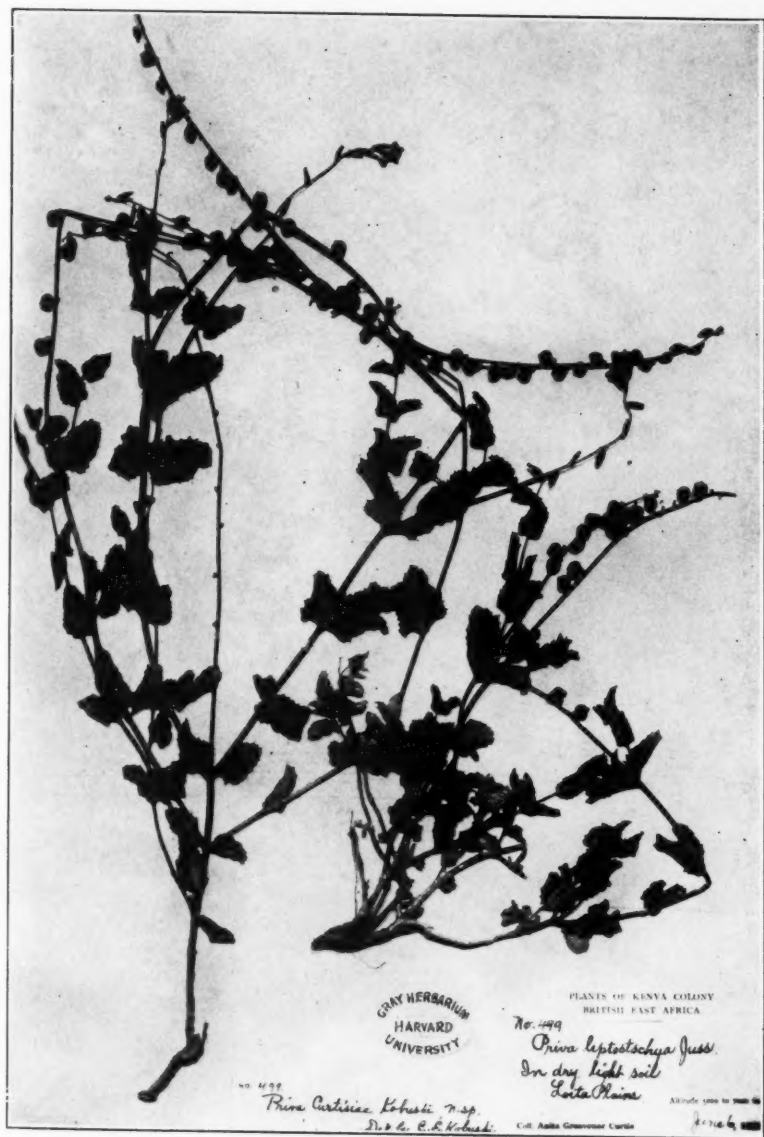
## EXPLANATION OF PLATE

## PLATE 2

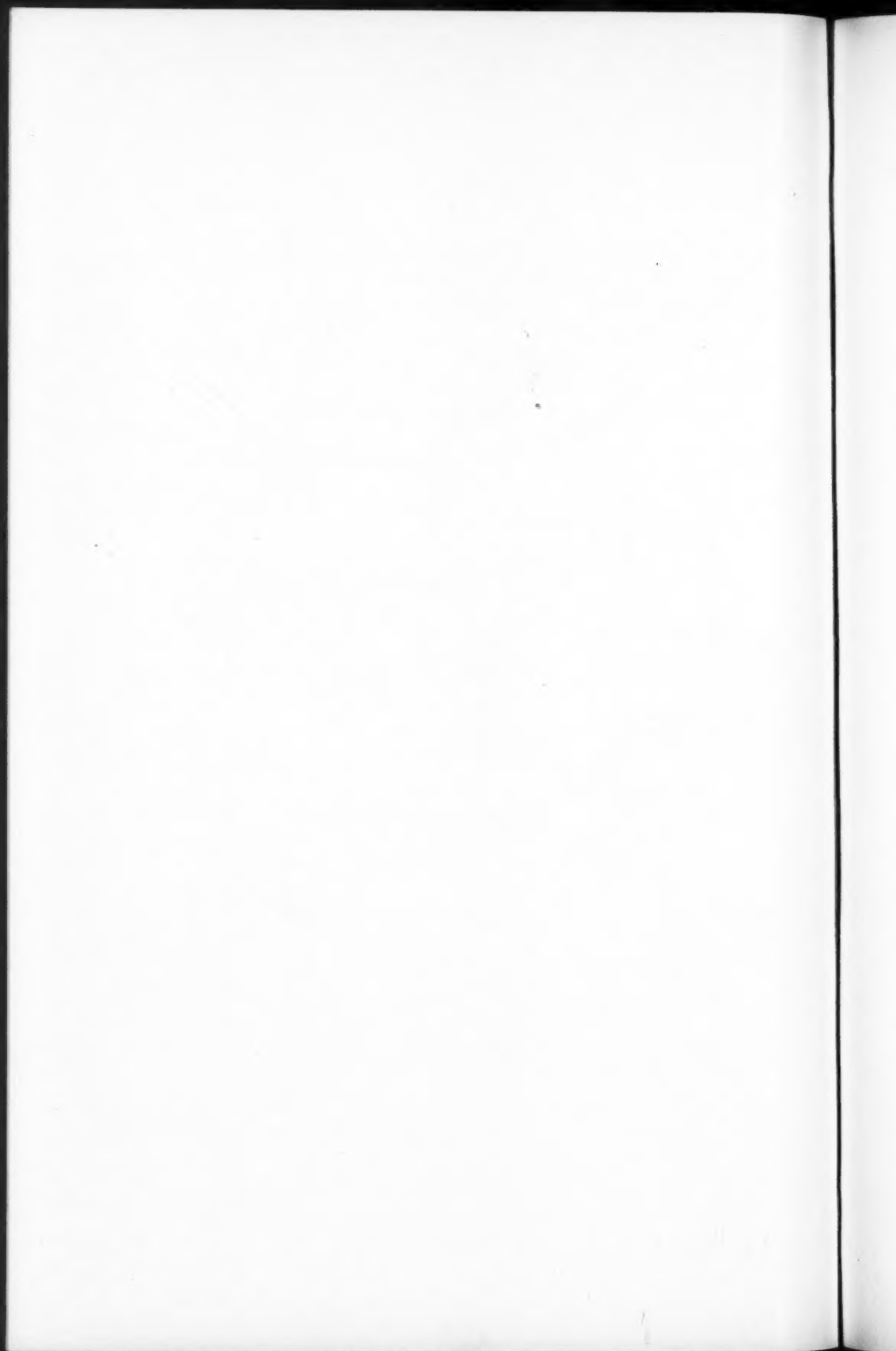
*Priva Curtisiae* Kobuski

British East Africa

From the type specimen, Curtis No. 499, in the Gray Herbarium  
of Harvard University.



KOBUSKI—REVISION OF GENUS PRIVA





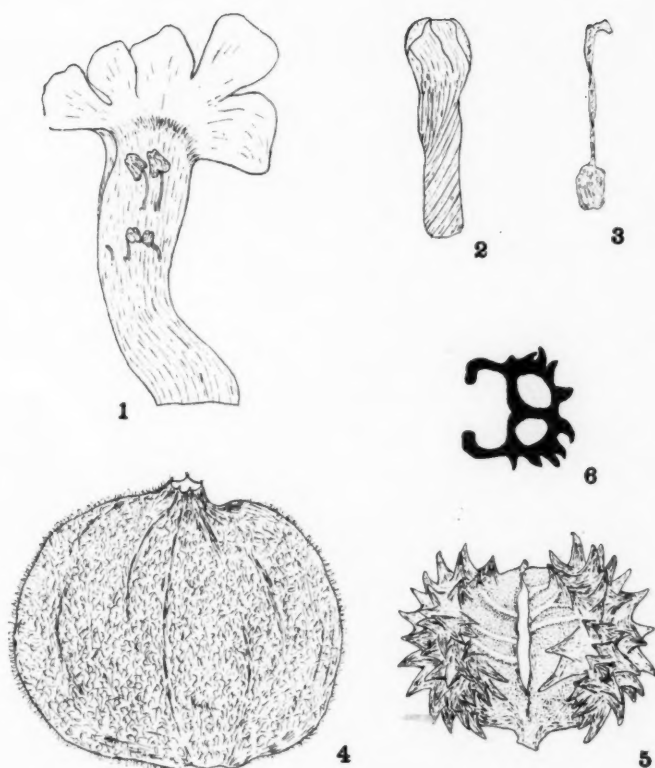
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## PLATE 3

*Priva Curtisiae* Kobuski

- Fig. 1. Open corolla,  $\times 6$ .
- Fig. 2. Corolla in bud,  $\times 6$ .
- Fig. 3. Pistil,  $\times 6$ .
- Fig. 4. Mature calyx,  $\times 6$ .
- Fig. 5. Mature fruit,  $\times 6$ .
- Fig. 6. Cross-section of coccus,  $\times 6$ .





KOBUSKI—REVISION OF GENUS *PRIVA*

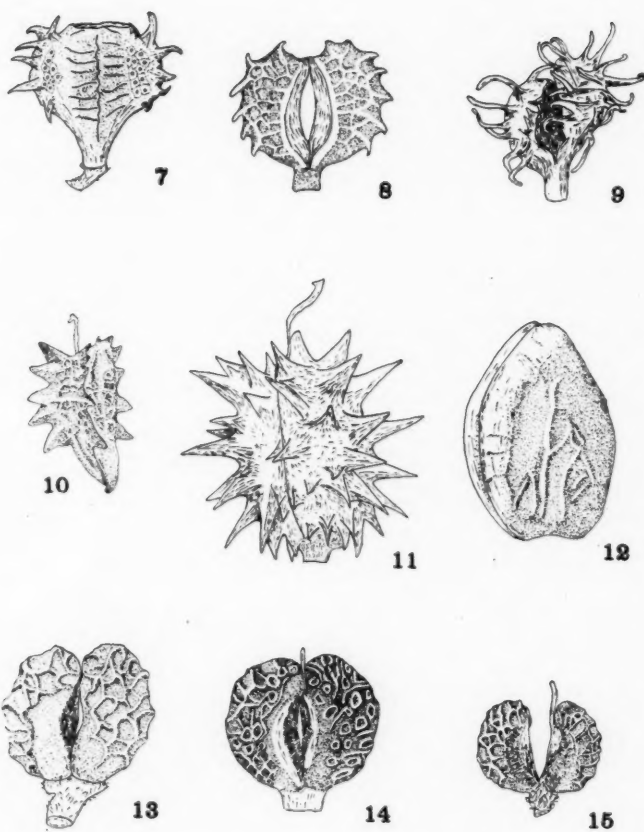


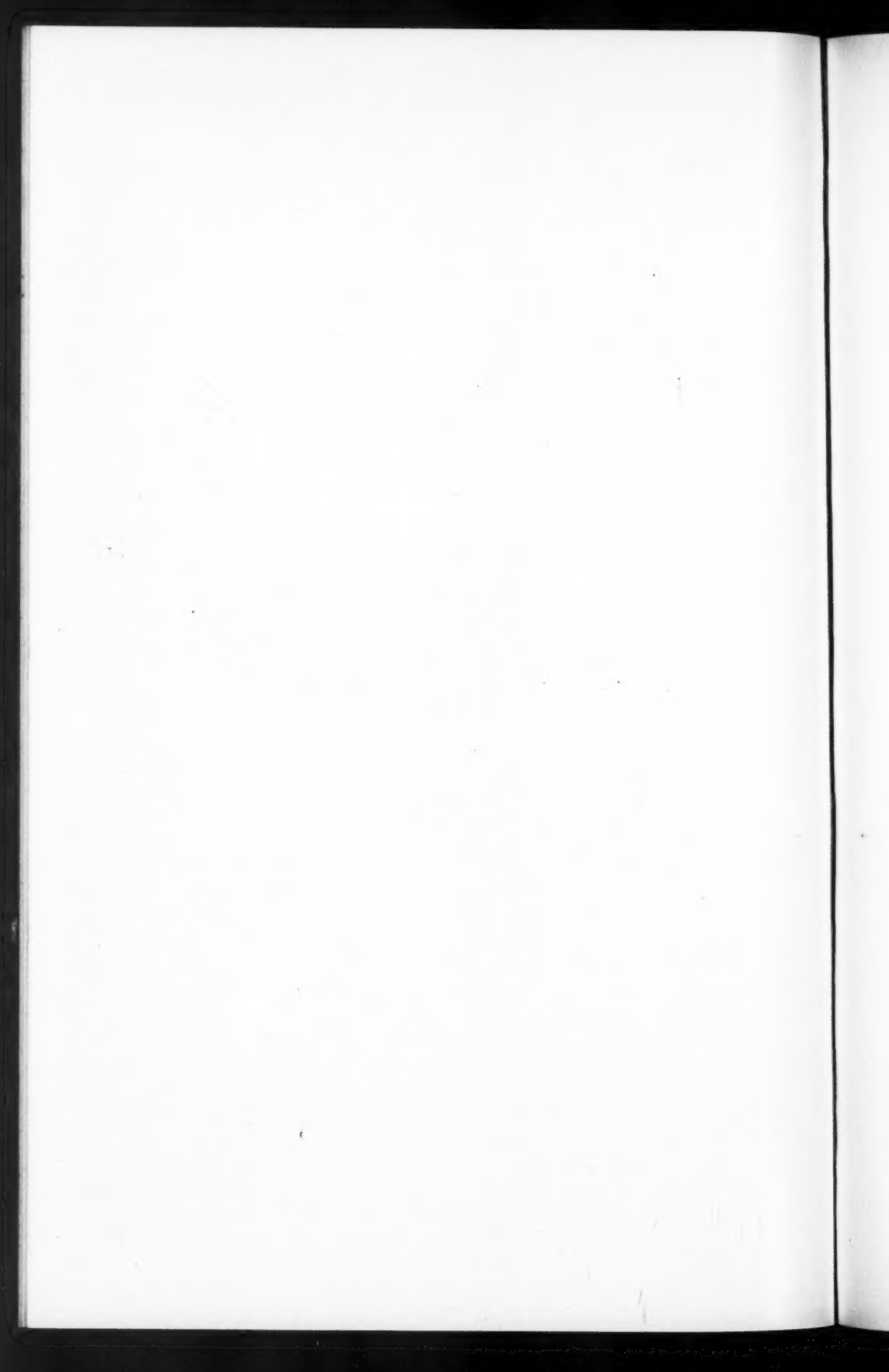


## EXPLANATION OF PLATE

## PLATE 4

- Fig. 7. Fruit of *Priva portoricensis* Urban,  $\times 6$ .  
Fig. 8. Fruit of *Priva leptostachya* Juss.,  $\times 6$ .  
Fig. 9. Fruit of *Priva bahiensis* DC.,  $\times 6$ .  
Fig. 10. Fruit of *Priva lappulacea* (L.) Pers.,  $\times 6$ .  
Fig. 11. Fruit of *Priva armata* Watson,  $\times 6$ .  
Fig. 12. Fruit of *Priva cuneato-ovata* (Cav.) Rusby,  $\times 6$ .  
Fig. 13. Fruit of *Priva rhinanthifolia* (Mart. & Gal.) Robinson,  $\times 6$ .  
Fig. 14. Fruit of *Priva aspera* HBK.,  $\times 6$ .  
Fig. 15. Fruit of *Priva mexicana* (L.) Pers.,  $\times 6$ .





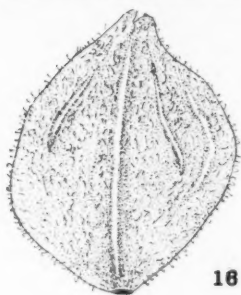




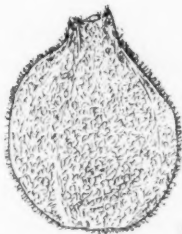
## EXPLANATION OF PLATE

## PLATE 5

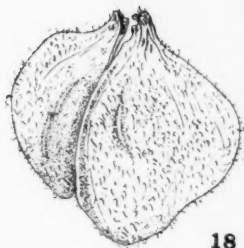
- Fig. 16. Mature calyx of *Priva portoricensis* Urban,  $\times 6$ .  
Fig. 17. Mature calyx of *Priva leptostachya* Juss.,  $\times 6$ .  
Fig. 18. Mature calyx of *Priva bahiensis* DC.,  $\times 6$ .  
Fig. 19. Mature calyx of *Priva lappulacea* (L.) Pers.,  $\times 6$ .  
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Fig. 22. Mature calyx of *Priva rhinanthifolia* (Mart. & Gal.) Robinson,  $\times 6$ .  
Fig. 23. Mature calyx of *Priva aspera* HBK.,  $\times 6$ .  
Fig. 24. Mature calyx of *Priva mexicana* (L.) Pers.,  $\times 6$ .



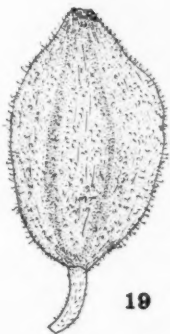
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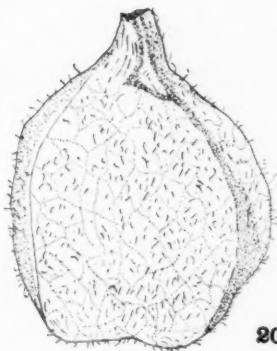
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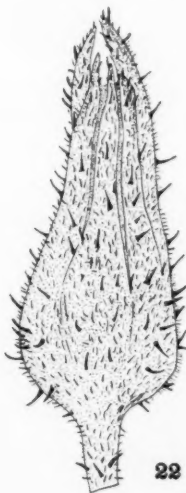
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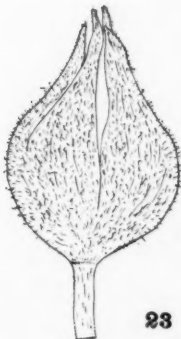
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## STUDIES ON SOUTH AMERICAN LABIATAE. II<sup>1</sup>

### SYNOPSIS OF THE GENUS SPHACELE

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#### SPHACELE

SPHACELE Benth in Edwards' Bot. Reg. sub. pl. 1289. 1829;  
Lab. Gen. et Sp. 567. 1834; et in DC. Prodr. 12: 254. 1848,  
nom. conservandum.

*Algue Laguen* Feuillée, Hist. Pl. Medecin. 4. 1725.

*Alguelaguen* Adanson, Fam. 2: 505. 1763.

*Dracocephalum* Balbis in Mem. Acad. Sci. de Turin 12<sup>1</sup>: 345.  
pl. 7. 1802-3 (non L.).

*Phytoxis* Molina, Sagga sulla Storia Nat. del Chili, ed. 2, 145,  
290. 1810.

*Sideritis* Kunth in Humboldt & Bonpland, Nov. Gen. et  
Sp. Pl. 2: 306. 1817 (non L.).

*Phytoxys* Sprengel, Syst. 2: 676. 1825.

*Alguelagum* Kuntze, Rev. Gen. 2: 511. 1891.

Frutices suffruticesve habitu foliisque fere *Salviae*, his saepius  
bullato-rugosis, subtus tomentosis; floribus in paniculis ad  
ramorum extremitates dispositis, rarius solitariis, saepius in  
verticillastris densioribus confertis; calycibus florentibus cam-  
panulatis vel tubuloso-campanulatis, subbilabiatis, dentibus  
lanceolato-subulatis, tubo frequenter aequilongis vel brevioribus,  
maturis nunc valde nunc paulo auctis, saepius chartaceis, frequen-  
ter inflatis; corollae tubo rarius calyci duplo longiore, saepius  
breviter exserto, superne gradatim ampliato, intus rarius omnino  
annulato, nectarostegio maximam partem e pilis diffusis areolam  
ad staminum bases facientibus consistente, limbo leniter bilabiato,

<sup>1</sup> Part I of Studies on South American Labiatae published in Ann. Mo. Bot. Gard.  
12: 107-132. 1925.

Issued May 8, 1926.

lobis subaequalibus, labioli medio majore; staminibus inclusis, loculis subparallelis; stylo subaequaliter bifido, corollam subaequante; nuculis atris, laevibus, obovatis, hilo obscuro; gynobase nullomodo aucto.

The term "Algue Laguen" was employed by Feuillée as a common name, being a transcription from the Araucanian dialect (see following under *Sphacele chamaedryoides*). This name was compiled by Adanson unchanged, with a hardly sufficient diagnosis, and latinized by Kuntze. *Phytors* of Sprengel was a compilation of Molina's name with slightly different spelling. The genus was not clearly understood until outlined by Bentham.

*Sphacele chamaedryoides* (Balbis) Briquet (*S. campanulata* Bentham) is herein considered the type species, since it is the species longest known and the first to be described, although not under the name *Sphacele*. Since Bentham did not employ the more recent concept of a type it is impossible to assign the role to any of the species of the genus as understood by him. In the preliminary synopsis in the 'Botanical Register,' *Sphacele Lindleyi* (*Stachys Salviae* Lindl.) was the first mentioned. In the monograph *Sphacele salviaefolia* (*Sideritis salviaefolia* Kunth) was the first described. In the account of the genus prepared for De Candolle's 'Prodromus' several newly described species were added, the entire arrangement altered, and *Sphacele speciosa*, which had appeared as the last species in the monograph, was here placed first, together with allied species.

#### CONSPECTUS SPECIERUM

- A. Flores in axillis foliorum vel bracteorum solitarii.
  - a. Flores in axillis foliorum superiorum solitarii. ....1. *S. tomentosa*
  - b. Flores in axillis bracteorum parvorum solitarii.
    - 1. Folia anguste oblonga vel oblanceolata, in basi extenuata  
.....2. *S. chamaedryoides*
    - 2. Folia lanceolata vel ovato-lanceolata, in basi truncata vel sub-  
hastata. ....5. *S. speciosa*
- B. Flores 2-numerosi in verticillastris dispositi.
  - a. Flores plerumque tres in verticillastris; racema patula, internodiis  
sat longis.
    - 1. Bractea foliosa, calycibus subaequilongis; calyx maturus floccoso-  
tomentosus.
      - α. Calyx tubulosus; corollae tubum patenter tubulosum  
.....4. *S. Salviae*



- β. Calyx subcampanulatus; corollae tubum late tubuloso-campanulatum.....3. *S. subhastata*
2. Bractea parva, pedicellis subaequilonga; calyx maturus glabrus vel parce hirsutus.
- α. Folia ovato-trigona vel oblonga, in basi hastata.
- I. Folia subtus dense tomentosa; corolla 2-2.5 cm. longa.....6. *S. lamiifolia*
- II. Folia subtus praecipue ad venas crispuli-tomentosa; corolla 1.5 cm. longa.....7. *S. Hieronymi*
- β. Folia oblonga vel lanceolata, in basi rotundato-angustata.
- I. Folia glabra, petiolis nec alatis.....8. *S. lancifolia*
- II. Folia hirsuta, petiolis alatis.....9. *S. hirsuta*
- b. Flores infra plerumque 6-9, supra 3-4 in verticillastris; in paniculis densis vel spicato-interruptis.
1. Flores in paniculis densis, frequenter laxis, vix interruptis, rarius subglobosis.
- α. Suffrutex floribus in spicis oblongis vel subglobosis saepius pedunculatis confertis.....10. *S. tenuiflora*
- β. Frutices floribus in paniculis amplis dispositis.
- I. Corolla 6-12 mm. longa.
- Folia bullato-rugosa, in basi subtruncata.....11. *S. salviaefolia*
- II. Corolla plerumque longitudine minus quam 6 mm.
- \* Bractea acutiuscula, calyces florentes superantia.
- † Folia in basi rotundato-angustata vel extenuata.
- ‡ Calycis dentes maturi lanceolato-acuminati.
- || Folia in basi rotundato-angustata, non extenuata; calycis dentes 2.5-3 mm. longi.....12. *S. inflata*
- ||| Folia in basi extenuata; calycis dentes 1.5-2 mm. longi.....14. *S. parviflora*
- ‡‡ Calycis dentes maturi ovato-trigoni, acuti vel obtusi.....13. *S. aurifera*
- †† Folia in basi patenter truncata vel cordata.....17. *S. heteromorpha*
- \*\* Bractea obtusiuscula, saepius rotundata calyces florentes vix aequantia.
- † Folia in basi truncata vel cordata.
- ‡ Folia oblonga, in basi truncata saepe subhastata.
- || Panicula canescenti-tomentosa; folia truncata, apice obtusa.....19. *S. intermedia*

- ||| Panicula pubescentia; folia truncata, subhastata, apice acuta vel lenissime acuminata.....18. *S. conferta*
- ‡‡ Folia ovata vel ovato-elliptica, in basi profundo- vel truncato-cordata.
  - || Folia ovata, profunde cordata.....21. *S. cordifolia*
  - ||| Folia ovato-elliptica, in basi anguste truncato-cordata.....22. *S. radula*
- †† Folia in basi angustata, anguste oblonga.....23. *S. mutica*
- 2. Flores in panicula submoniliforma, verticillastris inter se .5-1 cm. distantibus.
  - α. Folia in basi truncato-extenuata.....20. *S. Sprucei*
  - β. Folia in basi rotundata vel extenuata.
    - I. Folia lanceolata, superficie 10-12 × 4-6 cm. ....15. *S. acuminata*
    - II. Folia oblongo-elliptica superficie vel 10-17 × 2.5-4 cm. vel 5-8 × 7-1.5 cm.
      - \* Folia superficie 10-17 × 2.5-4 cm. ....16. *S. Mandoniana*
      - \*\* Folia superficie 5-8 × 7-1.5 cm. ....24. *S. mollis*

1. *Sphacele tomentosa* Benth. Lab. Gen. et Sp. 569. 1834.  
*Alquelagum tomentosum* Kuntze, Rev. Gen. 2: 511. 1891.

Suffrutex diffusus, humilis et prostratus, ramis teretibus, glabris, cortice discedente, ramulis obtuse quadratis, tomentosis; foliis 10-15 mm. longis, internodia maximam partem superantibus, oblongis, obtusis, in basi rotundato-subhastatis, margine convexiuscula, crenato-dentata, crenis obtusis, pagina superiore hispidula, viride, rugosa, inferiore cano-tomentosa, venis prominulis, pedicellis 5-8 mm. longis elatis; floribus in axillis foliorum superiorum solitariis, oppositis; calycibus florentibus 5 mm. longis, tubuloso-campanulatis, bilabiatis, hispido-tomentellis, dentibus aequilongis, tubo paulo brevioribus, acuminatis, fructiferibus 9-10 mm. longis, dentibus recurvis, posticis tribus sinu rotundato latiore ab anticis separatis; corollis 6 mm. longis, tubo 3.5 mm. longo, nectarostegio interrupte annulato, intus ad tubi basim e pilis consistente, limbo bilabiato, labro 1.5 mm. alto, emarginato, labiolo trifido, lobis lateralibus quam labro brevioribus, medio rotundato subduplo longiore; staminibus ad tubi medium in-



Fig. 1. Map showing distribution of the species of *Sphacele*, the numbers being those assigned to the species described in this paper.

sertis, didymis; stylo tubo aequilongo, superne dilatato; nuculis non visis.

Specimens examined:

PERU: no data given, *Dombey 278* (GH,<sup>1</sup> type collection).  
The locality recorded by Bentham is Cheuchin.

2. *Sphacele chamaedryoides* Briq. in Engl. & Prantl, Nat. Pflanzenfam., IV. Abt. 3 a, 291. 1897.

*Dracocephalum chamaedryoides* Balbis in Mem. Acad. Sci. de Turin 12<sup>a</sup>: 345. pl. 7. 1802-3.

*Phytoxis sideritifolia* Molina, Sagga sulla Storia Nat. del Chili, ed. 2, 145. 1810.

*Phytoxis acidissima* Molina, loc. cit. 290. 1810.

*Sphacele campanulata* Benth. in Edwards' Bot. Reg. 15: sub. pl. 1289. 1829; Lab. Gen. et Sp. 569. 1834; in DC. Prodr. 12: 255. 1848.

*Alguelagum chilense* Kuntze, Rev. Gen. 2: 511. 1891.

*Sphacele chilensis* Briq. Bull. de l'Herb. Boiss. 4: 805. 1896.

*Frutex subrigidus, ramosus foliosusque* circa 1 m. altitudine, ramis divaricatis, teretibus, glabris, cortice discedente, ramulis gracilibus superne puberulis, mox glabriusculis, teretibus, internodiis minus quam foliorum longitudine; foliis saepe in axillis fasciculatis, 1.5-4 cm. longis, .5-1 cm. latis, oblongis oblanceolatisque, apice obtusioribus, in basi saepius in petiolum brevem attenuatis, margine patenter revoluta, pulchre et regulariter crenata, crenarum culminibus saepius minus quam .5 mm. altis, inter se 1.5-2 mm. distantibus, pagina superiore atroviride, glabra, bullata, inferiore albo-tomentosa, vena media prominentiore, venis lateralibus reticulatis vel obscuris, petiolis 3-5 mm. longis elatis; floribus in panicula foliosa in axillis foliorum vel bractearum solitatim dispositis, internodiis pedicellis subduplo-triplo longioribus, bracteis inferioribus foliosis 1-1.5 cm. longis, superiore membranaceis, oblongo-lanceolatis, acuminatis, puberulis, maturitate saepe deciduis; calycibus florentibus 8-10 mm. longis, campanulatis, membranaceis, puberulis, tubo 4-5 mm. longo, dentibus subaequilongis, lanceolato-acuminatis, fructiferibus 15-18 mm. longis, dentibus tubum aequantibus, acuminatis vix tamen spinosis, bilabiatis, labia antica longiore, a postica sinibus rotundatis latioribus separatis, corollis 15-18

<sup>1</sup> For explanation of abbreviations of herbaria, see Studies on South American Labiatae. I. Ann. Mo. Bot. Gard. 12: 107. 1925.

mm. longis, puberulis, campanulatis, bilabiatis, labri lobis 2-2.5 mm. longis, labioli lateralibus 2-2.5 mm. longis, medio 3.5-4 mm. longo, omnibus rotundatis, nectarostegio annulato supra basim 4 mm. e pilis longis consistente; staminibus didymis, posticis 3-4 mm. longis, supra tubi medium, anticis 8-9 mm. longis, ad tubi medium positis, omnibus e tubo exsertis; stylo 15 mm. longo, exserto; nuculis obovatis, atris, 3 mm. longis.

Specimens examined:

CHILI: Chillan, Dec. 1869, *Couthouy* (GH); no data, *Gay* 149 (GH; US; NY); no data, *Styles* (ASP); no locality stated, Apr. 15, 1868, *Shuttleworth* (NY); Panguipulli, Oct. 1923, *Bro. Claude-Joseph* 2377 (US); Southern Chili, 1828, *Bertero* (MBG); Isle St. Marys, *Eights* (US); Ercilla, Feb. 1892, *Kuntze* (US).

The first binomial clearly to be applied to this species was that of Balbis,<sup>1</sup> namely, *Dracocephalum chamaedryoides*. His well-executed plate and the description leave no question as to this, although the author was ignorant of the origin of the seed from which the plants described had been grown.

Previously, however, in the first edition of a work by Molina<sup>2</sup> but not in the second edition, was described a plant called *Rosmarinus chilensis*. This plant was referred questionably by Bentham<sup>3</sup> to synonymy with his newly described species *Sphacele campanulata*. Kuntze,<sup>4</sup> however, referred it here without question and made the new combination *Alguelagum chilense*. Both authors apparently overlooked the fact that *Rosmarinus chilensis* was described under the Linnaean class "Diandria," with the corolla as having two stamens, true of *Rosmarinus* and not true of *Sphacele*. Since Molina was a careful worker and good observer, as may be learned by a perusal of his work, and since he was undoubtedly familiar with the Mediterranean *Rosmarinus*, there is no basis for assuming that he described any other than *Rosmarinus* under that name. This conclusion is further strengthened by the fact that *Rosmarinus officinalis* is found naturalized

<sup>1</sup> Balbis in Mem. Acad. Sci. Turin 12: 345. pl. 7. 1802-3.

<sup>2</sup> Molina, I. II. Sagga sulla Storia Naturale del Chili, ed. 1, 309. 1786. (transl. J. D. Brandis), original Italian edition not seen by the author.

<sup>3</sup> Bentham, G. Lab. Gen. et Sp., 569. 1834; et in DC. Prodr. 12: 255. 1848.

<sup>4</sup> Kuntze, O. Rev. Gen. 2: 511. 1891.

in various Latin-American regions, and in these countries is often grown in gardens, being used as a condiment.

In the second edition of Molina's work<sup>1</sup> the present species was, however, clearly described, this time under the generic name of *Phytaxis*. Feuillée<sup>2</sup> had previously described the plant by the phrase *Algue Laguen Sideritidis folia magno flore subcaeruleo*, and Molina, in describing the plant upon which he based not only the species but the genus *Phytaxis*, made it clearly synonymous with that described by Feuillée and apparently derived his binomial from Feuillée's phrase. It must be remembered that the term "Algue Laguen" was not employed in a generic sense but as a common name, the word "Lahuen" or "Laguen" (a low shrub) having been derived from the Araucanian dialect and applied by Feuillée and others in various combinations, as, for example, "Cachan-lahuen" (*Chironia chilensis* Willd.). *Algue-laguen* meant literally "devils shrub." In addition to the generic and specific description of *Phytaxis sideritifolia* in Italian, on page 145, Molina published a second more complete generic description but less complete specific description of the same plant in the Latin appendix (p. 290) in which all plants discussed in the narrative were arranged according to the Linnaean system. Here, however, the binomial used was *Phytaxis acidissima*, there being no mention of *P. sideritifolia*. It will be seen, then, that Molina (if he was also author of the appendix) applied two specific names to the same plant at different times.

Following the Kew rule, Bentham, in establishing his genus *Sphacele*, made the above-cited names synonymous with *Sphacele campanulata*, which binomial is still in general use. According to the usage of the International Code the second combination made by Briquet<sup>3</sup> is the proper one. Since the present case is illustrative of the manner in which an established and well-known name may be supplanted by one apparently never used save by its author, it is here suggested that the principle of usage embodied in the fifty-year rule of the International Code be extended to specific as well as generic names. Such application

<sup>1</sup> Molina, I. I. *Sagga sulla Storia Nat. del Chili*, ed. 2, 145. 1810.

<sup>2</sup> Feuillée, L. *Hist. des Pl. Medecin.*, 4. 1725.

<sup>3</sup> Briquet, J. in Engler und Prantl, *Nat. Pflanzenfam.*, ed. 1, IV. Abt. 3 a, 291. 1897.



of this principle would certainly reduce in number undesirable but otherwise necessary changes in established and widely current nomenclature.

3. *Sphacele subhastata* Benth. in Edwards' Bot. Reg. 15: sub pl. 1289. 1829; Lab. Gen. et Sp. 569. 1834; et in DC. Prodr. 12: 255. 1848.

*Algelagum subhastatum* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex ut videtur, ramis adscendentibus, superne floccoso-tomentosis, subteretibus, internodiis foliis subaequilongis; foliis 3-6 cm. longis, 8-14 mm. latis, *oblongis*, *apice obtusis*, in basi truncato-subhastatis, ad petiolum breviter cuneato-attenuatis, margine *fere recta*, crenata, crenarum culminibus circa 1 mm. altis, inter se 2-3 mm. distantibus, pagina superiore glabra, viride, rugosa sed non bullata, inferiore pallidiore, tomentosa, petiolis circa 1 cm. longis elatis; verticillastris 3-floribus, inter se 1-1.5 cm., bracteis internodiis paulo brevioribus, lanceolatis, acutis, subsessilibus, utrinque tomentellis; calycibus (?) florentibus 12-13 mm. longis, *tubuloso-campanulatis*, extus tomentellis, tubo *turbinato*, dentibus vix longiore, dentibus lanceolato-subulatis, subaequalibus, (?) maturis 18 mm. longis, forma fere immutatis, dentibus posticis ab anticis sinibus majoribus separatim; corollis nuculisque non visis.

Specimens examined:

CHILI: in fruticetis calidis collium Quillota, Nov. 1829, *Bertero* 1017 (NY).

The above-listed specimen is the only one seen by the author which may clearly be referred to this species. The collection of Fielding (GH) resembles this in leaf outline, but is hardly otherwise separable from *Sphacele Salviae*; furthermore a portion of the same Bertero collection at the Missouri Botanical Garden appears to connect the two species. As observed by Bentham, the above-described plant is intermediate between *S. Salviae* and *S. chamaedryoides* and in foliage character and calyx suggests strongly the possibility of its being a hybrid between the two. According to Bentham the corolla is blue, 9-10 lines long, and broadly tubular-campanulate with stamens subexserted.



4. *Sphacele Salviae* Briq. in Bull. Lab. Bot. Gen. Genève 1: 340. 1897.

*Stachys Salviae* Lindl. in Edwards' Bot. Reg. 15: sub pl. 1226. 1829.

*Sphacele Lindleyi* [Lindley] Benth. in Edwards' Bot. Reg. 15: sub. pl. 1289. 1829.

*Sphacele Lindleyi* Benth. Lab. Gen. et Sp. 570. 1834; et in DC. Prodr. 12: 255. 1848.

*Alquelagum Salviae* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex circa 1 m. altitudine, ramis erectis, teretibus, ramulis *floccoso-lanatis*, vix canaliculatis, angulis subacutis, internodiis quam foliorum longitudine paulo brevioribus; foliis 4-8 cm. longis, 2-4 cm. latis, lanceolatis, apice saepius obtusis, rarius breviter acuminatis, in basi truncato-cordatis subhastatisve, auriculis saepius rotundatis, margine revoluta, irregulariter crenato-dentata, crenarum culminibus circa 1-2 mm. altis, inter se 1.5-2.5 mm. distantibus, acutis, subapiculatis, pagina superiore viride bullato-rugosissima, dense sed minutissime tomentosa, inferiore albo-lanata, obscure reticulato-venulosa, petiolis lanatis, 1-2 cm. longis elatis; floribus in racemis simplicibus, rarius ramosis, albo-lanatis dispositis; verticillastris inter se 1-2 cm. distantibus, 1-3-floribus, oppositis, decussatim instructis, bracteis ovatis, *subfoliosis*, tomentosis, acutis vel breviter acuminatis, sessilibus, calycibus subaequilongis; calycibus *tubulosis*, *floccoso-lanatis*, florentibus 11-14 mm. longis, tubo 5-7 mm. longo, bilabiatis, labiis subaequalibus, dentibus labiarum superiorum 5 mm. longis, inferiorum 7 mm. longis, omnibus lanceolatis, setaceo-acuminatis, fructiferibus in basi leniter inflatis, 6-7 mm. latis, tubo 1 cm. longo; dentibus fere immutatis, *erectis*, *sinibus subaequalibus separatis*; corollis violaceis 2 cm. longis, tubulosis, fauce ampliatis, 5 mm. latis, ore obliquo, bilabiato, labiis subaequalibus, labiolo labro paulo longioribus, 4-5 mm. longo, lobis lateralibus medio dimidia parte brevioribus; staminibus didymis, *ad faucem sitis*, e tubo breviter exsertis, antheris 1.5 mm. longis, nectarostegio annulato e pilis densis 3 mm. supra tubi basim consistente; stylo breviter exserto; nuculis 2.5-3 mm. longis, atris, obovatis.

Specimens examined:

CHILI: ex collinis maritimis Chilensibus, prope Valparaiso, May 10, 1882, *Ball* (NY); Valparaiso, June 1885, *Rusby* 1399 (NY); Valparaiso, Feb. 1922, *Bro. Claude-Joseph* 1618 (US); Valdivia, 1862, *Bridges* (NY); in Gebüsch, Valparaiso, August 20, 1895, *Buchtien* (US); in fruticetis calidis collium Quillota, Nov. 1829, *Bertero* 1017 (MBG; GH; NY); near Valparaiso, 1851, *Gillies* (GH); near Valparaiso, Sept. 14, 1914, *Rose* 19115 (US; NY); Valparaiso, *Wilkes Exped.* (US; GH; ASP; NY); no data, *Fielding* (GH).

5. *Sphacele speciosa* St. Hil. in Benth. Lab. Gen. et Sp. 570. 1834; in DC. Prodr. 12: 254. 1848.

*Alguelagum speciosum* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex 1-1.5 m. altitudine, ramulis floccoso-tomentellis demum subglabris, obscure canaliculatis, angulis obtusis; foliis 5-7 cm. longis, 1.5-2.5 cm. latis, oblongo-lanceolatis apice obtusiusculis, junioribus in basi rotundatis, anguste truncato-subcordatis, maturis subsagittato-cordatis (Bentham), pagina superiore viride, glabra, bullata, inferiore dense et breviter rufo-lanata, reticulato-venulosa, pedicellis .5-1 cm. longis elatis; floribus in panicula laxa, ramulis gracilibus 5-10 cm. longis, in axillis bracteorum solitatem dispositis, decussatim instructis, nodis inter se 1-2 cm. distantibus, bracteis parvis, lanceolatis, acuminatis, deciduis subtentis; calycibus campanulatis, 13-venis, reticulato-venulosis, florentibus 12-13 mm. longis, tubo 6 mm. longo, venis hispidulis, dentibus aequilongis, lanceolato-acuminatis, bilabiatis, fructiferibus 18 mm. longis, tubo 10 mm. longo, plicato-venoso, ore 10-12 mm. lato, dentibus late patentibus, sinibus omnium subaequalibus; corollis 25 mm. longis, tubulosis, superne sensim ampliatis, bilabiatis, labiis aequilongis pro rata brevissimis, vix 2 mm., staminibus didymis, ad faucem sitis, filamentis anticis longis 6 mm., posticis dimidia parte brevioribus, antheris 1.5 mm. longis, nectarostegio antice supra tubi basim 4 mm. e pilis crassis consistente; stylo subexserto; nuculis 2.5 mm. longis, obovatis, atris.

Specimens examined:

BRAZIL: Serra da Itatiaia, retiro in campo May 15, 1902, *Dusen* 229 (US).

The type locality cited by Benthham is "Serra do Papagaio, Prov. Minas Geraes, in umbrosis rupestribus."

6. *Sphacele lamiifolia* Benth. Lab. Gen. et Sp. 570. 1834.

*Alquelagum lamiifolium* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex 1.5–2 m. altitudine, ramis teretibus, cortice discedente, ramulis rufo-lanatis, vix canaliculatis, quadratis, angulis sub-acutis, internodiis foliorum longitudine paulo brevioribus; foliis 8–11 cm. longis, 3–8 cm. latis, *ovato-triangulis*, apice obtusis sed tamen leniter acuminatis, in basi *truncato-cordatis vel subsagittatis*, margine irregulariter crenata, crenarum culminibus circa 1.5 mm. altis, inter se 3–6 mm. distantibus, pagina superiore viride, bullata, hispida, scabriuscula, inferiore *subconcolore*, subrufo-tomentosa vel sublanata, petiolis 1–1.5 cm. longis elatis; foliis supremis rotundato-ovatis, sessilibus; floribus in panícula laxa, ramulis gracilibus, rufo-villosis, angulis acutis dispositis; verticillastris 3-floribus, oppositis, decussatim instructis, distantibus, internodiis 1.5–2 cm. longis, bracteis rotundato-ovatis, tomentosis, apice breviter acuminatis, sessilibus, pedicellis quam calycibus brevioribus subtentis; calycibus campanulatis, scabriusculis, florentibus 12–14 mm. longis, purpurascens, fere *Salviae*, bilabiatis sed dentibus tamen aequilongis, 6 mm. longis, anguste lanceolatis, pungentibus, fructiferibus 2 cm. longis, late campanulatis, declinatis, chartaceis, ore obliquo, dentibus in basi 3–6 mm. latis, *setaceo-acuminatis, rigidis, patentibus, vix recurvis*, posticis tribus tamen ab anticis sinibus rotundatis latioribus separatis, pedicellis gracilibus 1 cm. longis elatis; corollis rubro-purpurascens, 1.5–3 cm. longis, *tubulosis*, fauce .5–.7 mm. latis, superne gradatim dilatis, *tubo recto vel leniter arcuato*, ore obliquo, bilabiato, labiis subaequalibus, 2.5–3 mm. longis, labioli lobis lateralibus lobo medio brevioribus, staminibus didymis, 2.5–5 mm. longis, ad faucem sitis, antheris 1.5–1.7 mm. longis, nectarostegio annulato e pilis densis 1 mm. supra tubi basim consistente; stylo breviter exserto; nuculis atris, glabris, obovatis, 3 mm. longis.

Specimens examined:

PERU: no data, *Weberbauer 5214* (FM); *Wilkes Exped.* (US; NY); *Matucana*, 2460 m., Apr. 12–May 3, 1922, *Macbride & Featherstone 178* (MBG; FM).

7. *Sphacele Hieronymi* Briq. in Bull. de l'Herb. Boiss. 4: 806. 1896.

Suffrutex erectus, 60 cm. altitudine, caulibus *villosulis*, vix canaliculatis, angulis obtusis; foliis *tenuibus*, 4–7 cm. longis, 2.5–3.5 cm. latis, oblongis vel ovato-deltaideis, apice acutis, in basi truncato-hastatis, auriculis angularibus acutis vel sub-obtusis, margine longe et lenissime convexa, crenata, crenarum culminibus .5–1 mm. altis, inter se 2–4 mm. distantibus, pagina superiore *viride*, *scabriuscula*, inferiore *praecipue ad venas tenuiter villosula*, petiolis 1.5–2 cm. longis elatis; floribus in panicula laxa, puberula, ramulis adscendentibus dispositis; verticillastris 3-floribus, oppositis, decussatim instructis, inter se 1–2 mm. distantibus, bracteis .5–1 cm. longis, ovato-lanceolatis, acuminatis, pubescentibus, subintegris subtentis; calycibus campanulatis, pilis brevibus ad basim tenuiter vestitis, florentibus 7–8 mm. longis, tubo 4–5 mm. longo, dentibus 3–3.5 mm. longis, anguste lanceolato-acuminatis, fructiferibus 1.5 cm. longis, tubo 9 mm. longo, campanulato, reticulato-venuloso, dentibus 4–5 mm. longis, *posticis tribus sinibus rotundatis latioribus ab anticis separatis*, pedicellis 7 mm. longis elatis; corollis 9–14 mm. longis, late tubulosis, ad annulum constrictis, superne 4–5 mm. latis, bilabiatis, labiis lobisque subaequalibus circa 1 mm. longis, labioli lobo medio tamen lateralibus duplo latiore; staminibus ad tubi medium sitis, didymis, anticis 3–4 mm. longis, posticis dimidia parte brevioribus, antheris 1 mm. longis; nectarostegio annulato e pilis densis 2.5–3 mm., supra tubi basim sito, annulo infra sinum posticum interrupto; stylo breviter exserto; nuculis obovatis, 2.5 mm. longis, atris.

Specimens examined:

ARGENTINA: inter el Pan de Azucar et Colanchangua, Sierra Chica de Cordoba, Nov. 11, 1881, *Hieronymus 1005* (NY, *type collection*); Sierra de Chica, Cordoba, Dec. 6, 1876, *Hieronymus* (US); El Candado, Catamarca, Feb. 5, 1917, *Jørgensen 1264* (US).

This species is apparently conspecific with *Sphacele floribunda* Benth.,<sup>1</sup> of which no type locality is given, *S. Grisebachii* Kurtz<sup>2</sup>

<sup>1</sup> Bentham, G. in DC. Prodr. 12: 254. 1848.

<sup>2</sup> Kurtz, F. in Rev. de Museo de la Plata 5: 294. 1894.

(*S. hastata* Griseb. not Gray), *Alquelagum Grisebachii* Kuntze, and perhaps also with *S. pampeana* Speg.<sup>1</sup> According to Kurtz, *S. Grisebachii* occurs in two forms "una con el follage mas oscuro, tiene caliz y corolla mas o menos azulada; la otra, con sus hojas mas claras, posee flores de color rosado. La primera forma es la mas comun en nuestra Sierra, la segunda la he observado solamente una ves entre Copacabana y Avellaneda." The flowers of *S. pampeana* are white, according to Spegazzini, and while nearly related to *S. hastata* Griseb. the species may be readily distinguished from this "por los dientes del caliz mas largos del tubo del mismo."

8. *Sphacele lancifolia* (Rusby), comb. nov.

*Alquelagum lancifolium* Rusby in Bull. N. Y. Bot. Gard. 4: 434. 1907.

Frutex robustus, ramulis canaliculatis, subglabris, purpur-ascentibus, angulis obtusis; foliis 10-18 cm. longis, 3-5 cm. latis, lanceolatis vel elliptico-lanceolatis, apice acutis, rarius breviter acuminatis, in basi rotundatis et in petiolum 1-2 cm. longum extenuatis, margine crenata, crenarum culminibus circa 1 mm. altis, inter se 2.5-3 mm. distantibus, pagina superiore viride, glabra, subnitente, inferiore concolore, glabra, leniter reticulato-venulosa; floribus in panicula ramosiore saepe subternata approximatis; verticillastris 3-floribus, oppositis, densis, spirale instructis, bracteis lanceolatis, glabris, caerulescentibus, apice acuminatis, in basi subsessilibus, reticulato-venulosis, flores subaequantibus; calycibus late campanulatis, glabris, caerulescentibus, florentibus 9-12 mm. longis, tubo 5-6 mm. longo, 5-6 mm. latis, dentibus aequilongis, setaceo-acuminatis, pungentibus, pedicellis 2-3 mm. longis elatis, fructiferibus tubuloso-campanulatis tubo 8 mm. longo, dentibus 7-8 mm. longis, forma immutata; corollis 12-13 mm. longis, tubulosis sed superne patenter dilatis, fauce 5-6 mm. latis, bilabiatis, labiis lobisque tamen subaequalibus circa 2 mm. longis; staminibus didymis, posticis 2-2.5 mm. longis, anticis duplo longioribus, omnibus ad tubi medium sitis, vix e tubo exsertis, antheris 1 mm. longis, nectarostegio subannulato e pilis densis supra tubi basim 3 mm. consistente,

<sup>1</sup> Spegazzini, C. Flora Ventana, 49. 1896.

annulo infra sinum posticum interrupto; stylo vix exserto; nuculis atris, obovatis, 2 mm. longis.

Specimens examined:

PERU: San Miguel, Urubamba Valley, 1800 m., June 9, 1915, Cook & Gilbert 1144 (US).

BOLIVIA: no data, Bang 1823 (US; GH; ASP; MBG; NY, TYPE).

9. *Sphacele hirsuta*, sp. nov.

Suffrutex ramosus ut videtur, ramis ramulisque hirsutis, quadratis, angulis obtusis, internodiis folia saepius superantibus; foliis 2-5 cm. longis, 1.5-2 cm. latis, oblongis, obtusis, in basi rotundato-extenuatis in petiolum alatum longum .5-1.5 cm. productis, pagina superiore bullato-rugosa, viride, tenuiter pubescente, inferiore cinerea, hirsuta, venis tamen prominulis, margine convexiuscula, crenata, crenarum obtusarum culminibus 1 mm. altis, inter se 1-2 mm. distantibus; floribus in panícula hirsuta dispositis, verticillastris 3-floribus, oppositis, maturitate inter se 1.5-2 cm. distantibus, bracteis foliis conformibus sed minoribus subtentis; calycibus florentibus 3.5-4 mm. longis, dentibus sub-spinosis, fructiferibus 8-9 mm. longis, campanulatis, plicato-venosis, hirsutis, declinatis, dentibus 3 mm. longis, acuminatis, pungentibus, recurvis, tribus posticis sinibus rotundatis ab anticis separatis, pedicellis 3 mm. longis elatis; corollis maturis vix satis, ut videtur tamen calycibus aequilongis, staminibus parvis ad tubi medium sitis; nuculis circa 2 mm. longis, obovatis.

Specimens examined:

COLOMBIA: Páramo near Bogotá, July 1917, Bro. Ariste-Joseph A 86 (US, TYPE).

10. *Sphacele tenuiflora* Benth. in DC. Prodr. 12: 257. 1848.

*Sphacele clinopodioides* Griseb. in K. Ges. d. Wiss. Göttingen, Abh. 24: 273. 1879.

*Alquelagum tenuiflorum* Kuntze, Rev. Gen. 2: 511. 1891.

Suffrutex e rhizomate lignoso, 20-40 cm. altitudine, ramis ramulisque herbaceis, quadratis, canescenti-tomentosis, angulis obtusis, internodiis foliorum longitudine aequantibus vel paulo brevioribus; foliis 2-5 cm. longis, 1-4 cm. latis, saepius oblongis



interdum ovatis, apice obtusis, in basi rotundatis rarius subtruncatis, *saepius in petiolum alatum brevem coarctatis*, margine crenata, subrevoluta, crenarum culminibus .5–1 mm. altis, inter se 2–3 mm. distantibus, pagina superiore rugosa tenuiter canopubescente, inferiore pallide tomentosa, solummodo ad marginem reticulato-venulosa; *floribus saepius in spicis vel glomerulis densis bracteosus confertis, spicis saepius pedunculatis, in fasciculis etiam corymbosis dispositis*, foliis floralibus ovatis vel rotundatis, sessilibus, verticillastris oppositis, spirale instructis, bracteosus, 3–6-floribus, bracteis subfoliosis vel membranaceis, flores superantibus, ovatis vel lanceolato-oblongis apice saepe acutis, venulosis, tomentosis, margine integra vel interrupta; bracteolis membranaceis, oblongis vel linearibus; calycibus campanulato-tubulosis, pubescentibus, patenter glanduloso-punctatis, florentium tubo 2.5–3 mm. longo, 10-venis, ore obliquo, bilabiato, dentibus anguste lanceolatis, 1–1.5 mm. longis, fructiferum tubo 4–5 mm. longo, labiis subaequalibus 3–4 mm. longis, *superiore declinata faucem claudente, dentibus tribus posticis sinibus acutis majoribus ab anticis separatis*, omnibus ovato-triangularis, acutis, apiculatis, pedicellis 2 mm. longis; corollis albis, 6–8 mm. longis, tubulosis, superne paulo ampliatis, subglabris, bilabiatis, lobis subaequalibus, circa 1–1.5 mm. longis, labioli lobo medio 1.5–2 mm. longo, nectarostegio subannulato e pilis intus ad tubi basim consistente; staminibus tubo inclusis, supra medium positus; stylo tubum aequante; nuculis 1.7–2 mm. longis, atris, obovatis.

Specimens examined:

BOLIVIA: Unduavi, 2460 m., Oct. 1885, *Rusby 1411* (NY); La Paz, Sonnige Abhänge, 3800 m., March, 1912, *Buchtien 109* (GH; NY); Sorata, in graminosis, locis aridis, 2600–3100 m., March, 1860, *Mandon 520* (GH; NY); no locality stated, 4200 m., *Asplund 5879* (US); Yungas, 1890, *Bang 167* (GH; US; ASP; MBG; FM; NY); Sorata, 3076 m., Feb. 1886, *Rusby 1407* (MBG; US; ASP; GH); no data, *Bang 1835* (GH; MBG; ASP; NY); near snow-line, Mt. Tunari, Cochabamba, 1891, *Bang 1044* (US; MBG; ASP; FM; GH; NY); Lake Titicaca, 2840 m., Nov. 1910, *Buchtien 2956* (US; NY); La Paz, 3800 m., May 6, 18, 1906, *Buchtien, 131* (US; NY).



PERU: Ollantay-tambo, 3000 m., May 13, 1915, *Cook & Gilbert 713* (US); Ollantay-tambo, 3000 m., July 18, 1915, *Cook & Gilbert 1899* (US); Cuzco, 3000–3600 m., *Herrera* (US); Ollantay-tambo, 3000 m., May 18, 1918, *Cook & Gilbert 801* (US).

ARGENTINA: Cuesta de Copina, Sierra Achala de Cordoba, Feb. 25, 1876, *Hieronymus 441* (FM; US); Sierra de Tucuman, Jan. 10–17, 1874, *Lorentz & Hieronymus 626* (US; FM; determined by Grisebach as *S. clinopodioides* Griseb.); Andalgala, Cerra Negra, 3500 m., Feb. 19, 1916, *Jørgensen 1307* (GH); same place and number, Feb. 20, 1917 (US); La Ciénega, Sierra de Tucuman, Jan. 10–17, 1874, *Lorentz & Hieronymus 738* (NY, LOCOTYPE and probably type collection of *Sphacele clinopodioides* Griseb.).

11. *Sphacele salviaefolia* Benth. Lab. Gen. et Sp. 567. 1834; in DC. Prodr. 12: 256. 1848.

*Sideritis salviaefolia* Kunth in Humboldt & Bonpland, Nov. Gen. et Sp. Pl. 2: 307. 1817.

*Alguelagum salviaefolium* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex ramis teretibus, cortice discedente; ramulis quadratis, canaliculatis, pulverulento-puberulis, angulis obtusis, internodiis minus quam foliorum longitudine; foliis 6–12 cm. longis, 2–5 cm. latis, lanceolato-oblongis, subacutis, in basi *rotundato-truncatis*, subinde ad petiolum coarctatis, margine crenata, subrevoluta, crenarum culminibus circa .1 mm. altis et inter se 2 mm. distantibus, regulariter dispersis, pagina superiore atro-viride, bullato-rugosa, glabra, inferiore plumbea, pulchre reticulato-venulosa, minute et dense tomentosa, petiolis puberulis 1–1.5 cm. longis elatis; floribus in panicula saepius ternata, ramulis lateralibus 3–5 cm. longis in axillis foliorum summorum exstis, ramo principale 5–8 cm. longo, 1.5–2 cm. lato, omnibus pedunculis 1–2 cm. longis elatis, villosulo-puberulis, verticillastris densis, oppositis, spirale instructis, 3–9 floribus, bracteis 5–10 mm. longis, submembranaceis, ovato-lanceolatis, acutis, reticulato-venulosis subtentis; calycibus tubulosis vel campanulato-tubulosis, villosulo-puberulis, his bracteisque saepius caerulescentibus, pedicellis 2 mm. longis elatis, fructiferibus 12 mm. longis, nutantibus, florentium tubo 4–5 mm. longo, 2.5–3.5 mm. lato, reticulato-

venulosis, ore obliquo, vix bilabiato, dentibus 3-4 mm. longis, anguste lanceolato-acuminatis, acribus, subaequalibus; corollis albido-caerulescentibus, 7-9 mm. longis, 2-3 mm. latis, campanulato-tubulosis, villosulo-puberulis, in facie inferiore prope annulum paulo sacculatis, sub-bilabiatis, labro bifido, lobis 1 mm. longis, labioli lobo medio paulo longiore; nectarostegio annulato imperfecto e pilis consistente supra tubi basim 2-3 mm. posito; staminibus minutissimis, 1-1.5 mm. longis, subaequalibus, in tubo inclusis, prope medium sitis, antheris 1.3 mm. longis; stylo tubum subaequante; nuculis siccis 1.7 mm. longis, 1.3 mm. latis, obovato-oblongis, atris, hebetibus, apice rotundatis, basi subtruncatis, hilo obscuro.

Specimens examined:

COLOMBIA: Bogotá, 1918, *Bro. Ariste-Joseph A 306* (US); bushy slope, base of mountain, 2800-2900 m., Oct. 4-8, 1917, *Pennell 2376* (US; MBG; FM; GH); near Bogotá, 2800 m., *Idinael 10* (NY); Bogotá, 1919, *Bro. Ariste-Joseph* (US); Sabana de Bogotá, May 1923, *Pring 102* (MBG); in montibus juxta Bogotam, Nov. 10, 1852, *Holton 486* (GH; NY).

12. *Sphacele inflata* Briq. in Bull. de l'Herb. Boiss. 4:848. 1896.

Frutex ramulis quadratis, canaliculatis, puberulis, angulis obtusis, internodiis minus quam foliorum longitudine; foliis 8-10 cm. longis, 2-3.5 cm. latis, tenuibus, *anguste oblongo-lanceolatis, leniter acuminatis, in basi rotundato-coarctatis*, margine crenato-serrata, crenarum culminibus circa .5 mm. altis, et inter se 1.5-2 mm. distantibus, regulariter dispersis, pagina superiore viride leniter bullata, glabra, inferiore rufo-tomentosa, obscure reticulato-venulosa, petiolis tomentosis .5-1.0 cm. longis elatis; floribus in panicula ramulis inferioribus adscendentibus, 5 cm. longis, omnibus rufo-tomentosis; verticillastris densis, infra approximatis, oppositis, spirale instructis, 6-floribus, bracteis 3-5 mm. longis, ovato-lanceolatis, acuminatis, submembranaceis, tomentosis; calycibus florentibus 3-4 mm. longis, campanulato-tubulosis, pedicellatis, tomentosis, tubo 1.5-2 mm. longo, dentibus subaequalibus, 1-1.5 mm. longis, fructiferum tubo circa 6 mm. longo, chartaceo-inflato, purpurascens, *dentibus erectis, acuminatis, 1-1.5 mm. longis; corollis longis 3.5-4 mm., tubulosis,*

superne sensim ampliatis, glabris, tubo 2.5–3 mm. longo, nectarostegio inannulato e pilis areolam inter staminum bases facientibus consistente, limbo subbilabiato lobis circa 1 mm. longis, subaequalibus, labioli lobo medio 1.5 mm. longo; staminibus didymis, anticis subexsertis, ad tubi medium sitis, stylo corollam subaequante; nuculis ovato-oblongis, fuscis,  $1.3 \times .8$  mm.

Specimens examined:

BOLIVIA: no locality stated, 2600 m., Apr. 13–21, 1892, *Kuntze* (NY, ? TYPE); Sorata, 2460 m., Feb. 1886, *Rusby 1416* (US; MBG; ASP; GH; NY).

The above description is based upon a specimen in the Kuntze Herbarium at the New York Botanical Garden which corresponds in every particular to Briquet's description. Briquet in that instance failed to cite the specimen before him. It is probable, however, that this is the type. If so, it appears to be an imperfect or immature specimen of the species illustrated by the beautiful series of the Rusby collection. This plant accords well with the Kuntze plant but the foliage attains a greater size, the panicle is much larger, being much branched and reaching a length of twenty centimeters and an equal width at the base. The calyx, furthermore, is larger in fruit, the tube being 7–8 mm. long and nearly as wide, the teeth being 2.5–3 mm. long. The mature calyx resembles that of *S. aurifera* but is not as large and the teeth are notably narrower and acuminate.

13. *Sphacele aurifera* (Rusby), comb. nov.

*Alquelagum auriferum* Rusby, Mem. Torrey Bot. Club 5: 108. 1891.

*Sphacele Kuntzeana* Briq. in Bull. de l'Herb. Boiss. 4: 805. 1896.

*Sphacele cochabambana* Briq. loc. cit. 807. 1896.

*Sphacele confusa* Briq. loc. cit. 806. 1896.

Frutex robustus ramulis quadratis, subcano-tomentosis, canaliculatis, angulis obtusis, internodiis minus quam foliorum longitudine; foliis 10–15 cm. longis, 3.5–5 cm. latis, lanceolatis, apice acutis vel longe leniterque acuminatis, in basi rotundatis, margine crenato-serrata, crenis acutis apiculatis, culminibus circa 1.5 mm. altis et inter se 2–3 mm. distantibus, pagina superiore viride,

glabra, bullato-rugosa, inferiore pallidiore rufula, reticulato-venulosa, sparse tomentella, glandulis aureis frequenter prominentioribus, petiolis 1-1.5 cm. longis elatis; floribus in panícula ampla, ramulis cano-tomentosis, adscendentibus dispositis; verticillastris densis, fructiferibus confertis, 6-floribus, oppositis, spirale instructis; bracteis membranaceis saepe caerulescentibus flores subaequantibus vel superantibus, acuminatis, reticulato-venulosis; calycibus membranaceis, glabris, ore obliquo, vix bilabiato, florentibus tubuloso-campanulatis, tubo 3-4 mm. longo, dentibus 1-1.5 mm. longis, acuminatis, fructiferibus inflato-campanulatis, 12-14 mm. longis, tenuibus, patente reticulato-venulosis, dentibus ovato-triangulis, acutis, subapiculatis, 3.5-4 mm. longis, corollis 4-5 mm. longis, tubulosis, bilabiatis, lobis subaequalibus, labioli lobo medio tamen longiore, tubo 3.5-4 mm. longo, vix annulato sed e medio ad faucem pilis longis ornatis, staminibus .5 mm. longis, inclusis, supra medium sitis; stylo subexserto; nuculis 2 mm. longis, obovatis, atris.

Specimens examined:

BOLIVIA: near snow-line, Mt. Tunari, Cochabamba, 1891, *Bang* 1107 (US; MBG; ASP; GH; NY, TYPE); Cochabamba, 3000 m., March 26, 1892, *Kuntze* (NY, type collection of *Sphacele cochabambana* Briq.); Cochabamba, 3000 m., March 26, 1892, *Kuntze* (NY, type collection of *Sphacele Kuntzeana* Briq.); near snow-line, Mt. Tunari, Cochabamba, 1891, *Bang* 1108 (US; MBG; ASP; GH; NY); no locality stated, 3800 m., March 18, 1892, *Kuntze* (NY, type collection of *Sphacele confusa* Briq.).

All specimens above cited are apparently from the same locality and while varying considerably in superficial aspect can hardly be considered distinct. *S. Kuntzeana* and *S. aurifera* are both based on specimens in full fruit and are unquestionably the same. *S. cochabambana* is a specimen just coming into flower in which the leaves are almost as broad as long. Only the uppermost internodes are present. As suggested by Briquet it may prove to be a variety. *S. confusa* appears to the author to be based on nothing other than a flowering specimen of *S. aurifera* in which no calyces have become mature. By reason of the large size of the mature calyx and the resultant crowding, a fully fruiting branch has an appearance quite different from a

branch in flower. The relationship of this species with *Sphacele inflata* Briq. is close but uncertain to the author.

14. *Sphacele parviflora* Benth. in DC. Prodr. 12: 256. 1848.

*Alguelagum parviflorum* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex circa 1 m. altitudine, ramis teretibus, cortice discedente; ramulis quadratis, canaliculatis, *tomentoso-puberulis*, *subrufis*, angulis obtusis, internodiis minus quam foliorum longitudine; foliis 10–18 cm. longis, 4–6 cm. latis, lanceolato-ellipticis, breviter acuminatis, in basi ad petiolum attenuatis, margine crenata, subrevoluta, crenarum culminibus circa 1 mm. altis et inter se 2 mm. distantibus, regulariter dispersis, pagina superiore atroviride bullato-rugosa, glabra, inferiore subrufa, reticulato-venulosa, minute et dense tomentosa, petiolis puberulis, 1–1.5 cm. longis elatis; floribus in panícula ramulosa 12–20 cm. longa exstita, ramulis inferioribus adscendentibus, 8–12 cm. longis, omnibus rufo-pubescentibus; verticillastris densis infra approximatis, oppositis, spirale instructis, 6-floribus, bracteis flores subaequantibus, ovatis vel lanceolatis, subacuminatis, in basi saepius coarctatis, submembranaceis, reticulato-venulosis sed vena media venisque parallelis tamen prominentibus; calycibus florentibus campanulato-tubulosis, tubo 3–4 mm. longo, reticulato-venulosis, villosulo-puberulis, ore obliquo, subbilabiato, dentibus subaequalibus, tribus posticis in basi connatis, lanceolato-acuminatis, 1 mm. longis, fructiferum tubo 6–7 mm. longo, chartaceo-inflato, fauce paulo constricto, dentibus 1.5–2 mm., subconniventibus; corollis albis, 4–5 mm. longis, tubulosis, supra sensim ampliatis, villosulo-puberulis, tubo 3–3.5 mm. longo, vix annulato, nectarostegio tamen e pilis ad bases staminum inferiorum areolam facientibus consistente, ore obliquo, subbilabiato, lobis 1.5 mm. longis, subaequalibus, labioli lobo medio 2 mm. longo, patulo; staminibus minutis, 1.5–2 mm. longis, subaequalibus, prope tubi medium positis; antheris .5 mm. longis, e tubo vix exsertis; stylo tubum subaequante; nuculis obovato-oblongis, atris, 1.3 × .8 mm.

Specimens examined:

COLOMBIA: Popayan, *Lehmann 806* (NY); no data, *Lehmann 5504* (US); hillside field, 1800–2100 m., Salento, Caldas, July



25-31, 1922, *Pennell, Killip & Hazen 8747* (ASP; NY); thicket growth (machimbi), 1700-1900 m., Cuatro Esquinas to Rio Piendamó, El Cauca, June 6, 1922, *Pennell & Killip 6398* (US; ASP); thicket growth, 1700-1900 m., Cuatro Esquinas to Rio Piendamó, El Cauca, June 6, 1922, *Pennell & Killip 6387* (ASP); bushy banks, 2200-2400 m., Salento, June 27, 1922, *Pennell & Killip 7278* (US; ASP; NY); thicket growth, 1700-1900 m., Cuatro Esquinas to Rio Piendamó, El Cauca, June 6, 1922, *Pennell & Killip 6383* (US; ASP; NY).

VENEZUELA: Paramos between St. Domingo and Chacopo, Merida, 3300 m., *Jahn 1129* (US); Silla de Caracas, 2460 m., May 21, 1874, *Kuntze Herb. 1658* (NY); prope coloniam Tovar, 1854-5, *Fendler 868* (MBG; NY); Agua de Obispo, 2500 m., Sept. 24, 1922, *Jahn 1170* (US).

*S. Lindeniana* Briq. may be referable here. Briquet's description was based upon a specimen in fruit with no flowers. From the description it seems hardly distinct from the forms of *S. parviflora* which grow in this region, which are quite variable in foliage character, particularly with reference to size.

15. *Sphacele acuminata* Grisebach in K. Ges. d. Wiss. Göttingen, Abh. 19: 238. 1874.

*Alquelagum acuminatum* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex vel arbuscula aromatica foliosa ramosa; ramuli 2-4 m. altitudine, ramulis quadratis, canaliculatis, angulis obtusis; foliis 9-15 cm. longis, 2.5-5.5 cm. latis, membranaceis, lanceolatis, apice leniter acuminatis, in basi ad petiolum coarctatis, vix attenuatis, margine regulariter serrato-crenata, crenarum culminibus 1-1.5 mm. altis, pagina superiore subscabra, vix bullata, subglabra, inferiore pallida, tomentella, petiolis tomentosis 1-1.5 cm. longis elatis; floribus in panicula diffusiore, 15 cm. longa, 15-20 cm. lata, pyramidata, ramulis floccoso-tomentosis, lateralibus valde divaricatis dispositis; verticillastris 2-6-floribus, oppositis, spirale instructis, inter se .5 cm. distantibus; bracteis membranaceis, quam floribus brevioribus, ovatis, tomentosis, reticulato-venulosis subtentis; calycibus turbinato-campanulatis, membranaceis, puberulis, pedicellis 1.5 mm. longis elatis, florentium tubo 1.5 mm. longo, dentibus 1 mm. longis, lanceolato-

acuminatis, fructiferibus *subcampanulatis*, tubo 5–6 mm. longo, ore obliquo, *subbilabiato*, dentibus 2–3 mm. longis, triangulovatis, acutis; corollis albis, tubulosis superne vix ampliatis, 4 mm. longis, lobis subaequalibus, .5–7 mm. longis, staminibus minutissimis, .4 mm. longis, supra tubi medium insertis, antheris filamentis aequilongis, nectarostegio e pilis ad bases filamentorum areolas duas facientibus consistente; stylo e corolla breviter exserto; nuculis non visis.

Specimens examined:

ARGENTINA: Andalgalá, Feb. 1915, *Jørgensen 1265* (MBG); same locality and number, Sept. 2, 1915 (GH); same locality and number, Apr. 2, 1917 (US).

16. *Sphacele Mandoniana* Briq. Ann. Conserv. Genève 2: 176. 1898.

Frutex ramulis quadratis, canaliculatis, puberulis, angulis obtusis, internodiis minus quam foliorum longitudine; foliis 10–15 cm. longis, 2–4 cm. latis, *anguste lanceolatis*, leniter *acuminatis in basi ad petiolum* attenuatis, margine crenato-serrata, subrevoluta, crenarum culminibus circa 1 mm. altis et inter se 1.5–2 mm. distantibus, regulariter dispersis, pagina superiore viride, leniter bullata, glabra, *inferiore puberula*, *obscura reticulato-venulosa*, petiolis puberulis, .7–1.0 cm. longis elatis; floribus in panícula ramosiore 12–20 cm. longa, ramulis inferioribus divergentibus 10–12 cm. longis, omnibus puberulis; verticillastris oppositis, spirale instructis, *inter se circa .5 cm. distantibus*, infra 5-floribus, supra 3-floribus, bracteis 2–4 mm. longis, ovatis, acuminatis, puberulis, submembranaceis; calycibus florentibus 3 mm. longis, campanulatis, tubo 1.5–2 mm. longo, reticulato-venulosis, puberulis, dentibus subaequalibus, 1–1.5 mm. longis, subulatis, patulis, *fructiferum tubo 6–7 mm. longo*, chartaceo-ampliato, fauce haud constricto, dentibus 1.5–2 mm. longis; corollis 4–5 mm. longis, tubulosis, superne sensim ampliatis, glabris, tubo 3–3.5 mm. longo, nectarostegio e pilis ad staminum inferiorum bases areolam facientibus consistente, *subbilabiatis*, lobis 1–1.5 mm. longis, subaequalibus, labioli lobo medio 1.5 mm. longo; staminibus minutis, 1.5 mm. longis, subaequalibus, ad tubi medium positis; antheris .5 mm. longis, e tubo vix exsertis,



stylo tubum subaequante; nuculis obovato-oblongis, fuscis,  $1.3 \times 8$  mm.

Specimens examined:

BOLIVIA: Prov. Larecaja, viciniis Sorata, Espada in dumosis, 2600 m., March, 1889, *Mandon 505* (GH, type collection); Yungas, 1890, *Bang 686* (US; MBG; ASP; GH; NY); Unduavi, Nord Yungas, 3300 m., Nov. 1910, *Buchtien 317* (US).

17. *Sphacele heteromorpha* Briq. in Bull. de l'Herb. Boiss. 4: 847. 1896.

Frutex robustus, vel arbuscula 2 m. et ultra altitudine, ramulis rufo-tomentosis, canaliculatis, internodiis minus quam foliorum latitudine, angulis obtusis; foliis maximam partem magnis, 10-18 cm. longis, 5-8 cm. latis, *submembranaceis*, saepius *ovato-ellipticis*, apice acutis vel breviter acuminatis, in basi saepius rotundato-truncatis rarius in petiolum extenuatis vel subcordatis, margine irregulariter crenata, crenarum culminibus circa .5-1 mm. altis, inter se 2-3 mm. distantibus, pagina superiore viride, glabra, bullato-rugosa, inferiore tenuiter rufo-tomentellis, patenter reticulato-venulosis, petiolis 2-4 cm. longis elatis, foliis *juvenalibus elongato-oblongis*, *subtus valde rufo-pannosis*; floribus in panicula ramulis rufo-tomentosis *subfasciatis* dispositis, verticillastris densis vix interruptis, oppositis, subdecussatim instructis, bracteis ovatis, calycibus aequilongis vel subduplo longioribus, acutis, sessilibus, tomentosis, reticulato-venulosis sed venis parallelis tamen prominentibus, bracteolis parvis, linearibus, plerisque duobus; calycibus tubuloso-campanulatis, tomentellis, florentium tubo 2.5 mm. longo, subsessilibus, intus ad basim pubescente, ore obliquo, bilabiato, dentibus lanceolatis, acutis, subapiculatis, 1-1.3 mm. longis, tribus posticis in basi connatis, maturis 5-6 mm. longis, tubulosis, tubo 4-4.5 mm. longo, dentibus fere immutatis; corollis 4-7 mm. longis, tubulosis, *superne ampliatis*, bilabiatis, lobiis subaequalibus, labro profunde bifido, lobis rotundatis, lobis labioli lateralibus lobo medio duplo brevioribus; staminibus parvis 1-2.5 mm. longis, ad tubi medium sitis, nectarostegio annulato e pilis densis ad bases filamentorum praecipue anticorum consistente; stylo corollam aequante; nuculis non visis.

Specimens examined:

BOLIVIA: no locality stated, 1600 m., Apr. 13–21, 1892, *Kuntze* (NY, *type collection*); Unduavi, Nordyungas, 3200 m., Feb. 1914, *Buchtien* (GH); Yungas, 1890, *Bang 689* (ASP; US; MBG; GH; NY, *Alquelagum confertum* Rusby non Kuntze); Unduavi, 2460 m., Oct. 1885, *Rusby 1415* (ASP; GH; US; NY, *Alquelagum confertum* Rusby non Kuntze).

18. *Sphacele conferta* Benth. *Plantae Hartweg*. 244. 1846; et in DC. *Prodr.* 12: 256. 1848.

*Alquelagum confertum* Kuntze, *Rev. Gen.* 2: 511. 1891.

Frutex circa 1 m. altitudine, ramulis quadratis, puberulis, canaliculatis, angulis obtusis, foliis 8–12 cm. longis, 4–5.3 cm. latis, oblongo-lanceolatis, apice acutis, in basi truncato-sub-sagittatis, margine revoluta crenato-dentata, longe leniterque convexa, crenarum culminibus acutis, circa 1–1.5 mm. altis, inter se 1.5–2 cm. distantibus, pagina superiore atro-viride, glabra, bullata, inferiore reticulato-venulosa, cano-tomentosa, petiolis puberulis 1.5–2 cm. longis elatis; floribus in panícula, ramulis rufo-tomentosis, adscendentibus, 4–6 cm. longis, congestis; verticillastris confertis, oppositis, spirale instructis, 6-floribus, bracteis calycis maturos aequantibus vel superantibus, ovatis, obtusis, puberulis, sessilibus subtentis; calycibus tubulosis, puberulis, 10-venis, membranaceis, ore obliquo, breviter bilabiato, florentium tubo 2.5–3 mm. longo, dentibus circa 1 mm. longis, acutis obtusiusculisque, fructiferibus 7 mm. longis, dentibus 1.5–2 mm. longis, ovato-triangulis, acutis vel obtusis, tribus posticis longioribus, pedicellis 1 mm. longis elatis; corollis 6 mm. longis, bilabiatis, lobis subaequalibus, labioli lobo medio tamen lateralibus duplo longiore, tubo 4 mm. longo, sensim superne dilatis, nectarostegio e pilis ad filamentorum anticorum bases consistente; staminibus posticis 1.5 mm. longis, anticis majoribus, 2 mm. longis, omnibus ad tubi medium sitis, stylo subexsertis; nuculis 1.5 mm. longis, oblongo-obovatis, atris.

Specimens examined:

COLOMBIA: prope pagum Pitayo, Prov. Popayan, *Hartweg 1348* (NY, *type collection*); San Cristobal, Nov. 1911, *Bro. Apollinaire & Bro. Arthur 62* (US); open near Rio Anambiu, El Cauca, 2900–3200 m., June 11–16, 1922, *Killip 6763* (ASP; US).

PERU: sunny canyons, 2460 m., 7 mi. s. w. of Pano, May 8, 1923, *Macbride 3575* (US; MBG).

The above-cited specimen collected by Macbride is referred here with some hesitation. The Hartweg collection at the New York Botanical Garden, upon which the above description is largely based, has decidedly truncate leaves which are mostly subsagittate, the auricles when present being about 5 mm. long, divaricate and acute, the blade being somewhat narrowed above them, expanding toward the middle. The leaves of the Killip collection are similar but less pronounced in the sagittate character and slightly cordate. The leaves of the collection made by Bro. Apollinaire and Bro. Arthur are only occasionally subsagittate but are mostly cordate. All are of about the same texture. The foliage of the Peruvian plant collected by Macbride is very similar to the last-mentioned Colombian plant, but is more densely cano-tomentose on the lower surface. While the calyces of the Colombian plants are usually obtuse, they are distinctly acute on the Killip plant, which is otherwise hardly separable from the type. In the Macbride collection, however, the calyx teeth are distinctly acute and even somewhat acuminate, the other flower characters being about the same as those of the Colombian plants. The species is apparently a variable one and may very probably include *S. bullata* Kunth and *S. paniculata* Kunth, the descriptions of which suggest similar plants. The author has been unable to identify definitely any collections seen by him with either of these two species, however. *S. intermedia*, a species herein newly described is closely allied and may prove conspecific. The calyces of this, however, are nearly those of *S. mutica*.

19. *Sphacele intermedia*, sp. nov.

Frutex altitudine circa 2 m., ramis teretibus, cortice discedente, ramulis floccoso-tomentosis, canescentibus, quadratis, canaliculatis, angulis obtusis; foliis 4-8 cm. longis, 2-3 cm. latis, oblongis, apice obtusis, in basi truncato-subcordatis, pagina superiore subcinerea (in spec. siccis), subglabra, ad venas tomentella, rugoso-bullata, inferiore pallidior, canescenti-tomentosa, obscure reticulato-venulosa, margine convexiuscula, subrevoluta,

crenata, crenarum culminibus .5–1 mm. altis, inter se 1.5–2 mm. distantibus, petiolis *floccoso-tomentosis* 1 cm. longis elatis; floribus in panícula, ramulis adscendentibus, canescentibus, 3–5 cm. longis congestis; verticillastris confertis, sub-6-floribus, vix oppositis, spirale instructis, bracteis *rotundatis, obtusis*, infra tomentosis, supra glabris, sessilibus subtentis; calycibus subsessilibus, membranaceis, *canescenti-tomentosis*, ore obliquo, patenter bilabiato, *labiae superioris lobis brevissimis obtusis*, florentium tubo 2.5 mm. longo, dentibus inferioribus, ovato-triangulis, 1.5 mm. longis, labia superiore paulo breviora, fructiferibus pallide violaceis, tubo 4 mm. longo, dentibus fere immutatis; corollis (?) albis, 3.5–4 mm. longis, *calycem vix superantibus*, bilabiatis, lobis subaequalibus, labioli medio lateralibus tamen duplo longiore, tubo 3 mm. longo, nectarostegio e pilis ad filamentorum anticorum bases areolam facientibus consistente; staminibus .8 mm. longis, ad tubi medium sitis, *antheris pro floribus magnitudine magnis*; stylo vix exserto; nuculis non visis.

Specimens examined:

ECUADOR: Otavalo to Malchingui, 2400–3000 m., April 12, 1923, *Hitchcock 20839* (US, TYPE); vicinity of Tablón de Ona, Sept. 27, 1918, *Rose 23068* (NY).

A plant closely allied to both *S. conferta* and *S. mutica*. In the shape of the leaves it suggests *S. Sprucei*; in texture and pubescence, however, its foliage resembles that of *S. conferta*; in flower character and habit it is close to *S. mutica*.

20. *Sphacele Sprucei* Briq. Ann. Conserv. Genève 2: 178. 1898.

Frutex ut videtur elatus, ramulis undique dense *floccoso-tomentosis*, canaliculatis, quadratis, angulis obtusis; foliis *oblongis, obtusis, in basi truncato-constrictis, in petiolum brevem decurrentibus*, margine longe leniterque convexiuscula, revoluta, crenata, culminibus .5 mm. altis, inter se 2 mm. distantibus, obtusis, subapiculatis, pagina superiore glabra, viride, bullata, inferiore crispulo-tomentella, venis evidentioribus, his petiolisque 1–1.5 cm. longis, *floccoso-tomentosis*; floribus in panícula, ramulis divergentibus, *floccoso-tomentellis*; verticillastris sub-6-floribus, *densis, globosis, oppositis, moniliformis*, inter se .5–1 cm. distanti-

bus; bracteis rotundatis, tomentosis, calycibus aequilongis; calycibus florentibus 3 mm. longis, subsessilibus, turbinato-campanulatis, tomentosis, bilabiatis, dentibus posticis in basi connatis, omnibus tamen obtusis, aequilongis, fructiferibus 4-5 mm. longis, campanulatis, dentibus majoribus sed forma immutatis; corollis 3.5 mm. longis, e calyce vix exsertis, tubo 2.5-3.5 mm. longo, nectarostegio e pilis inter filamentorum anticorum bases areolam facientibus consistente, labro bifido, lobis eis labioli lateralibus aequilongis, lobo medio duplo longiore; staminibus didymis, paulo supra tubi medium insertis, antheris e tubo exsertis; stylo in tubo incluso; nuculis obovatis, atris, 1.3 mm. longis.

Specimens examined:

ECUADOR: in Andibus, 1857-9, *Spruce 6090* (GH, *type collection*).

21. *Sphacele cordifolia* Benth. in DC. Prodr. 12: 257. 1848.

*Alquelagum cordifolium* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex ramulis rufo-lanatis, canaliculatis, quadratis, angulis obtusis, internodiis latitudinem foliorum subaequantibus; foliis 5-9 cm. longis, 3-5 cm. latis, ovato-oblongis, obtusis, tamen leniter acuminatis, basi patenter cordatis, lobis circa 1 cm. longis, rotundatis, margine crenata, crenarum culminibus .5-1 mm. altis, inter se 2-2.5 mm. distantibus, pagina superiore atro-viride, bullato-rugosa, hirtella, pagina inferiore pallidiore, lanato-tomentosa, petiolis 1.5-2 cm. longis, lanato-pubescentibus elatis; floribus in panícula ramulis rufo-lanatis, divergentibus, 3-6 cm. longis, infimis iterum ramosis dispositis; verticillastris densis vix interruptis, sub-6-floribus, oppositis, spirale instructis, bracteis ovato-rotundatis, tomentosis, sessilibus, flores subaequantibus, venis parallelis, apice saepe breviter bidentatis subtentis; calycibus campanulato-tubulosis, hirtellis, subsessilibus, florentium tubo longo 3 mm., ore obliquo patenter bilabiato, dentibus aequilongis, sed posticis in basi connatis, omnibus lanceolatis, acutis, subapiculatis, patulis, 1.5-2 mm. longis; corollis 5-6 mm. longis, tubulosis, superne paulo dilatatis, tubo 4-4.5 mm. longo, ore bilabiato, labiolo labro triplo longiore, lobo medio patulo, 1.7 mm. longo, staminibus didymis, posticis 1 mm. longis, supra



tubi medium sitis, anticis 2 mm. longis, ad tubi medium sitis, antheris subaequalibus, *e tubo breviter exsertis*, nectarostegio e pilis ad filamentorum anticorum bases consistente; stylo tubum subaequante; nuculis non visis.

Specimens examined:

PERU: above Ayavaca, Piura, 2900–3000 m., May 1912, Weberbauer 6368 (FM).

22. *Sphacele radula* Benth. in DC. Prodr. 12: 257. 1848.

*Alguelagum radulum* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex 2 m. altitudine, ramulis quadratis, canaliculatis, floccoso-tomentosis, sublanatis, angulis obtusis; foliis 7–15 cm. longis, 4–7 cm. latis, *ovato-ellipticis* apice obtusis, *in basi rotundatis*, truncato-subcordatis, pagina superiore atro-viride bullato-rugosa, glabra, inferiore praecipue in foliis juvenalibus rufo-tomentosa, sublanata, margine crenato-serrata, crenarum culminibus 1–1.5 mm. altis, inter se 2–3 mm. distantibus, petiolis 2 cm. longis *in basi patenter dilatis*, *rufo-tomentosis* elatis; floribus in panicula ramulis rufo-tomentosis dispositis; verticillastris densis, vix interruptis, 6–9-floribus, oppositis, subdecussatim instructis, *bracteis ovatis*, *sessilibus*, *obtusis*, membranaceis, tomentosis, reticulato-venulosis, vena media solummodo prominentiore subtentis; calycibus tubuloso-campanulatis, tomentellis, florentibus 4 mm. longis, subsessilibus, ore oblique, bilabiato, labia inferiore brevior, dentibus subaequalibus 1 mm. longis, *obtusis*; corollis 4.5–5 mm. longis, tubo superne patenter ampliato, bilabiatis, lobis subaequilongis, labioli lobo medio tamen lateralibus duplo longiore, staminibus subdidymis ad tubi medium sitis, saepe 3 mm. longis, nectarostegio e pilis ad filamentorum anticorum bases areolam facientibus consistente; stylo corollam aequante; nuculis non visis.

Specimens examined:

ECUADOR: Loja, between San Lucas and Ona, 2200–3100 m., Sept. 7, 1923, Hitchcock 21577 (US).

23. *Sphacele mutica* Benth. Pl. Hartweg. 145. 1844; in DC. Prodr. 12: 256. 1848.

*Alguelagum muticum* Kuntze, Rev. Gen. 2: 511. 1891.

Frutex 1-2 m. altitudine, ramulis quadratis, obscure canaliculatis, canescenti-puberulis, angulis obtusis; foliis 5-9 cm. longis, 1-2 cm. latis, oblongo-lanceolatis, apice obtusis vel acutiusculis, in basi ad petiolum coarctatis, margine revoluta, obscure crenata, crenarum culminibus .2-.3 mm. altis, inter se 1.5-2 mm. distantibus, pagina superiore rugoso-bullata, bullis parvis, molliter puberula, inferiore plumbea, pulchre reticulato-venulosa, minute tomentosa praecipue et dense in foliis juvenalibus, petiolis longis .5 cm. elatis; floribus in panícula 6-12 cm. longa ramulis 3-8 cm. longis, tomentosis dispositis; verticillastris sub-6-floribus, oppositis, dense et spirale instructis, bracteis parvis ovato-rotundatis, tomentosis, sessilibus, flores vix aequantibus subtentis; calycibus tubuloso-campanulatis sub-5-venis canescenti-tomentosis, florentibus 3 mm. longis, dentibus .5-1 mm. longis, obtusis, fructiferibus 5 mm. longis, subinflatis vix bilabiatis, dentibus immutatis, pedicellis 1 mm. longis elatis; corollis tubulosis, superne paulo ampliatis, 3.5-4 mm. longis, lobis parvissimis, subaequalibus, labioli lobo medio tamen lateralibus duplo longiore, .7 mm. longo; staminibus parvis, inclusis, ad tubi medium sitis, nectarostegio e pilis ad filamentorum anticorum bases areolam facientibus consistente; stylo in tubo incluso; nuculis (?) maturis obovato-oblongis, fuscis, 1.5 mm. longis.

Specimens examined:

ECUADOR: in montibus, Loxa (Loja), *Hartweg 809* (NY, *type collection*); no data, *Jameson* (US); Loja, Sept. 29-Oct. 3, 1918, *Rose 23277* (NY); Loja, no date, *Lehmann 4954* (NY).

24. *Sphacele mollis* sp. nov.

Frutex ramis teretibus, cortice discedente, ramulis canaliculatis, minute tomentosis, quadratis, angulis obtusis, internodiis minus quam foliorum longitudine; foliis 3-8 cm. longis, 1.5-5 cm. latis, oblongis, utrinque acutis subaequaliter coarctatis, margine obscure crenata vel subintegra, pagina superiore atro-viride (in spec. siccis) minutissime puberulis, inferiore pallidiore, tomento densiore vestita, petiolis puberulis .5 cm. longis elatis; floribus in panícula diffusiore dispositis, ramulis gracilibus, puberulis, divaricatis, 4-6 cm. longis, verticillastris oppositis, spirale in-

structis, densioribus, 6-9 floribus, *inter se .5-1 cm. distantibus*, bracteis flores paulo superantibus, ovatis, *acutis, in basi angustatis*, foliosis, reticulato-venulosis, puberulis; calycibus campanulatis, praesertim ad venis puberulis, florentibus 2.5 mm. longis, tubo 2 mm. longo, ore obliquo, subbilabiato, dentibus tamen subaequalibus, acutis, minute apiculatis, (?) maturis 5 mm. longis, paulo inflatis, ore vix constricto, dentibus 1.5 mm. longis, pedicellis 2 mm. longis elatis, corollis tubulosis superne leniter ampliatis, bilabiatis, labiis lobisque subaequalibus labioli lobo medio tamen longioribus, tubo 2 mm. longis, e calyce vix exserto, staminibus minutissimis, .3 mm. longis, ad tubi medium sitis, nectarostegio e pilis longis sparsis intra filamentorum anticorum bases areolam facientibus consistente; stylo tubum subaequante; nuculis (?) maturis, atris, obovatis, 1.2 mm. longis.

Specimens examined:

PERU: above Olmos, 1900-2000 m., Prov. Lambeyeque, May 1915, Weberbauer 7106 (FM, TYPE).

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New species, varieties, and combinations in **bold face** type; synonyms in *italics*; and previously published names in ordinary type.

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## EXPLANATION OF PLATE

## PLATE 6

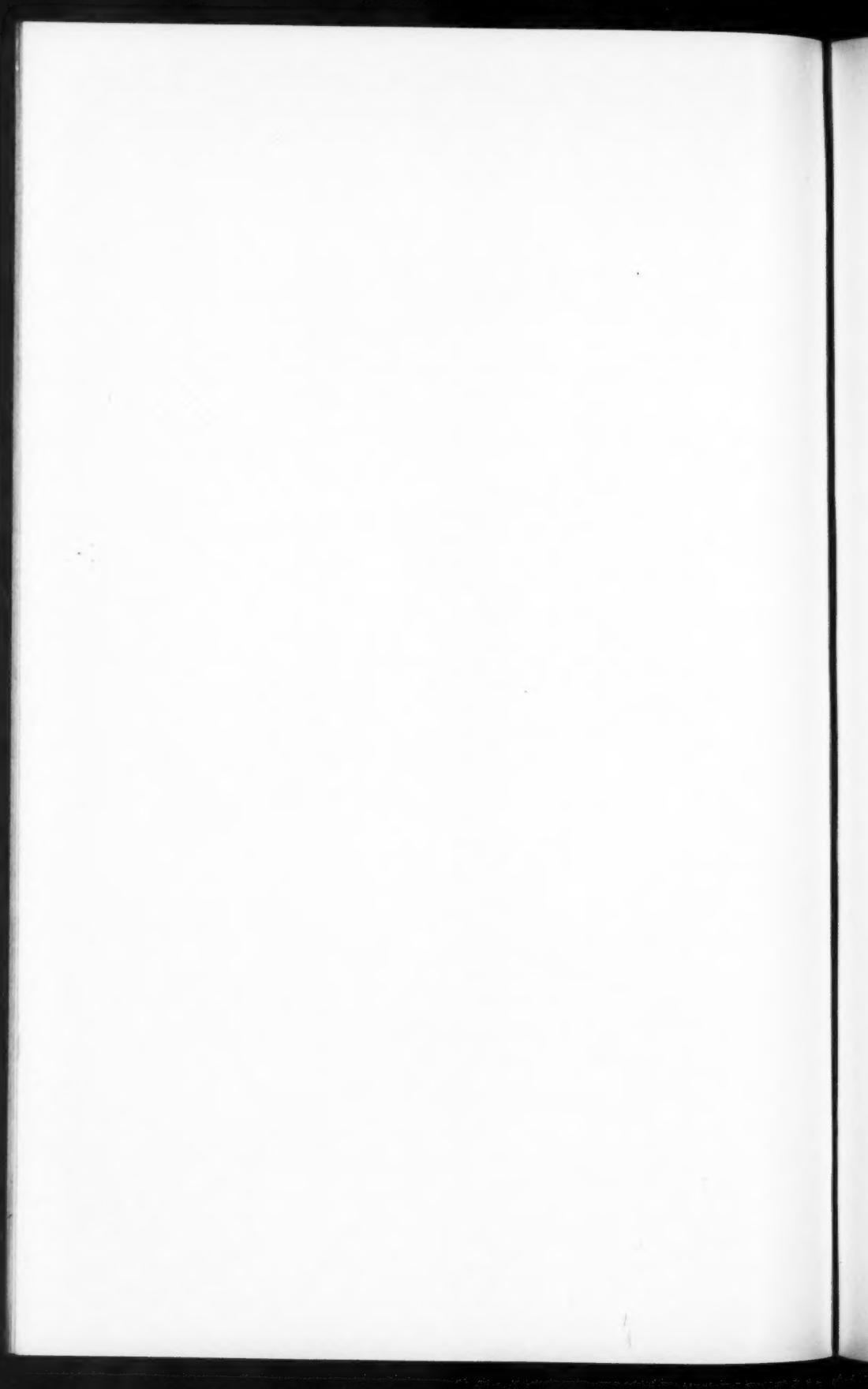
*Sphacela hirsuta* Epling

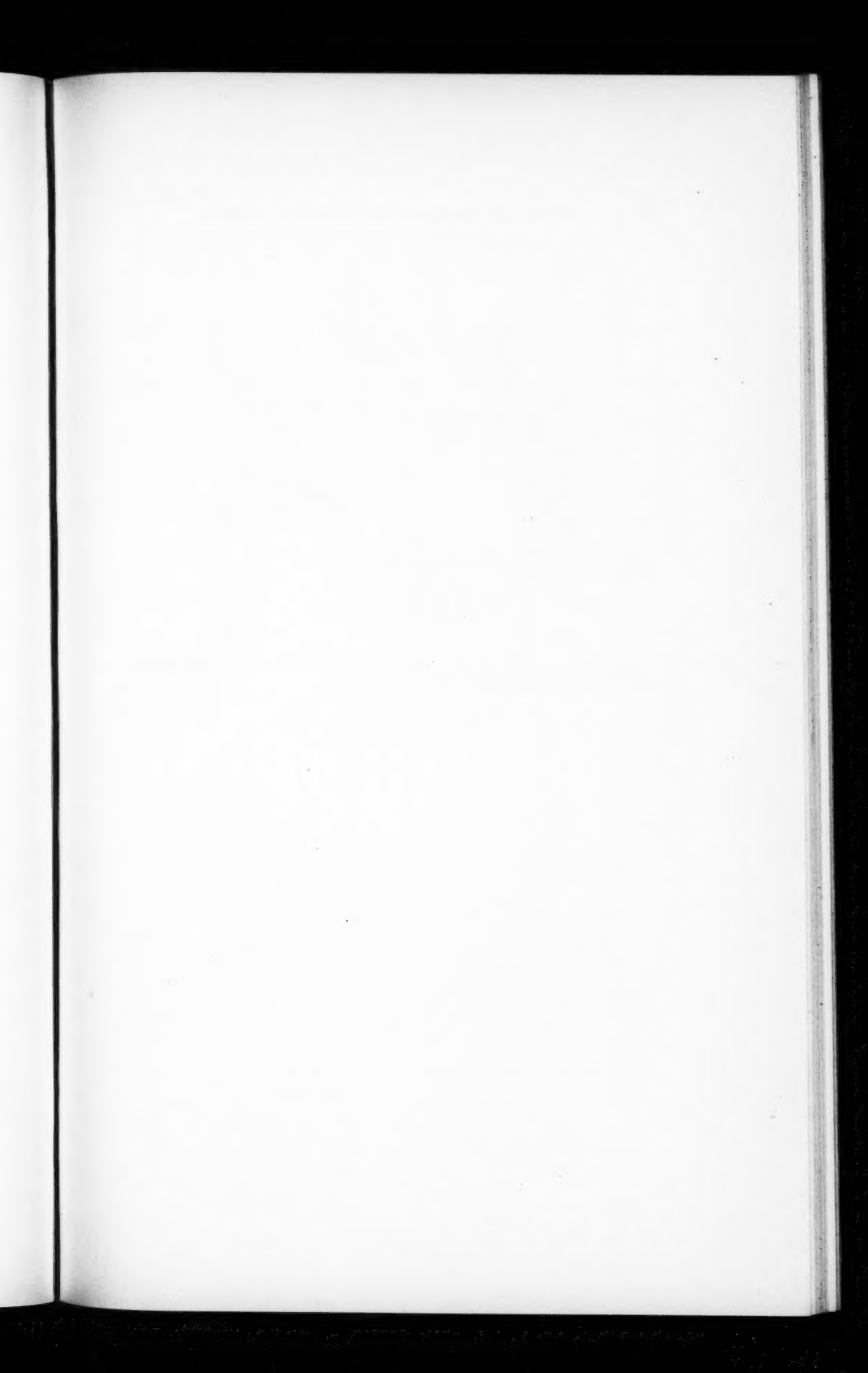
Colombia

From the type specimen, *Bro. Ariste-Joseph A 88*, in the United States National Herbarium.



EPLING—SOUTH AMERICAN LABIATAE





## EXPLANATION OF PLATE

## PLATE 7

*Sphacele intermedia* Epling

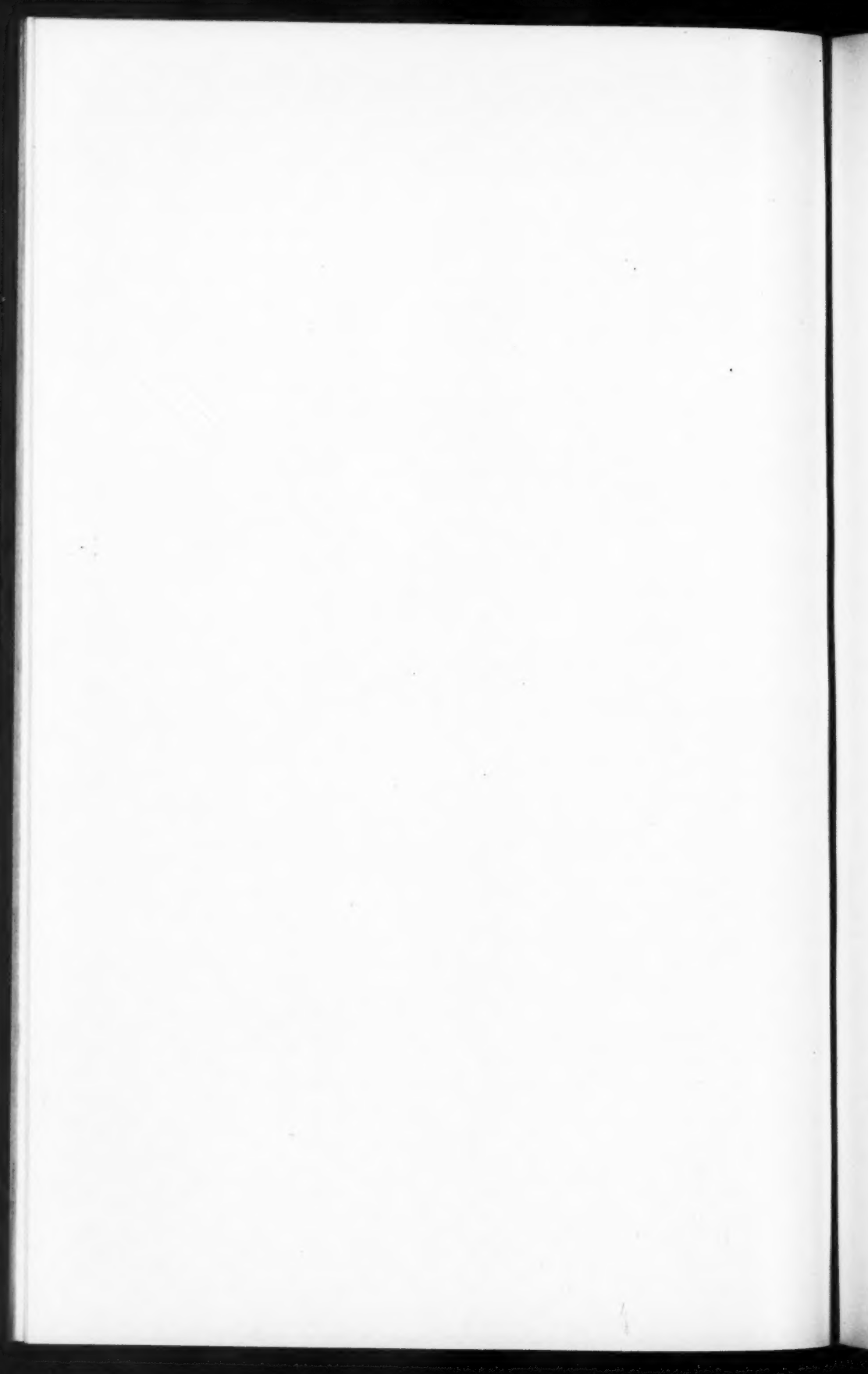
Ecuador

From the type specimen, *Hitchcock 20839*, in the United States National Herbarium  
(originally determined as *Sphacele conferta* Benth).





EPLING—SOUTH AMERICAN LABIATAE



## A REVISION OF THE GENUS BOUCHEA (EXCLUSIVE OF CHASCANUM)<sup>1</sup>

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### HISTORY

The small genus *Bouchea* of the *Verbenaceae* was first described by Chamisso<sup>3</sup> in 1832. The genus as constituted originally embraced two species, namely, *B. pseudogervae*, based on specimens collected by Beyrich near Friburg in Brazil, and *B. Ehrenbergii* which was described from specimens collected by Ehrenberg near Port au Prince in San Domingo. The former species had been described and illustrated previously by St. Hilaire<sup>4</sup> under the name *Verbena pseudogervae*. In 1844 Walpers<sup>5</sup> in his 'Repertorium' recognized the two species of Chamisso and added a third species, *B. hyderabadensis*, from India.

The next mention of the genus was by Schauer<sup>6</sup> who elaborated the *Verbenaceae* for De Candolle's 'Prodromus' in 1847. Schauer extended the limitations of the genus *Bouchea* to include *Chascanum* Meyer,<sup>7</sup> a small but natural alliance of South African plants. He divided *Bouchea* into two sections, namely, *Rhagocarpium* and *Chascanum*. To the former section he referred six species, four of which—*B. pseudogervae*, *B. Ehrenbergii*, *B. laetevirens*, and *B. agrestis*—were attributed to the Western Hemisphere, and two—*B. marrubifolia* and *B. pterygocarpa*—to North Africa. To the latter section he referred seven species, six of which—*B. cuneifolia*, *B. cernua*, *B. garepensis*, *B. pubescens*, *B. pinnatifida*, and *B. adenostachya*—are indigenous to South

<sup>1</sup> An investigation carried out at the Missouri Botanical Garden in the Graduate Laboratory of the Henry Shaw School of Botany and submitted as a thesis in partial fulfillment of the requirements for the degree of master of science in the Henry Shaw School of Botany of Washington University.

<sup>2</sup> Mrs. Lawrence Sherod.

<sup>3</sup> Cham. in *Linnaea* 7: 252-254. 1832.

<sup>4</sup> St. Hil. Pl. Us. des Bres. pp. 1-4. t. 40. 1824-1828.

<sup>5</sup> Walp. Rep. 4: 11-12. 1844.

<sup>6</sup> Schauer in DC. Prodr. 11: 557-569. 1847.

<sup>7</sup> Meyer, Comm. 1: 275-277. 1835.

Issued May 8, 1926.

Africa, and one, *B. hyderabadensis*, to India. Another species, *B. pumila* of South Africa, was transferred from *Chascanum* to *Bouchea*, but being imperfectly known was not given a definite position in either section. Thus fourteen species of *Bouchea* were recognized by Schauer in De Candolle's 'Prodromus'. Subsequent authors, including Sonders,<sup>1</sup> Gürke,<sup>2</sup> and Pearson,<sup>3</sup> have in general followed Schauer's inclusive generic interpretation of the group.

From 1847 to 1925 additional species of *Bouchea* from America and Africa have from time to time been described, so that the number of species now recorded is more than double the number recognized by Schauer. In the meantime, however, no monographic study or revision of the group has been made.

The present study was undertaken to determine whether *Bouchea* as amended by Schauer represents a homogeneous and natural genus or whether there might not be at least two distinct elements involved. A careful survey of all species, as far as material could be obtained, has been made and the writer is convinced that *Bouchea* as circumscribed by Schauer contains two diverse elements which are best regarded as distinct genera. The following revision of the true *Bouchea* is presented.

#### GENERAL MORPHOLOGY

*Stems.*—The stems in the different species of *Bouchea* vary from typically herbaceous to distinctly woody and shrubby forms. In some cases the base only is ligneous while others are woody throughout. The stems are sometimes simple, but as a rule they become more or less dichotomously branched. The main axis and the branches may be four-angled or terete. Quadrangular branches are the more common, but the main axis often becomes terete toward the base.

*Leaves.*—The leaves show considerable diversity in outline, size, texture, and character of margin. In two species the leaves are sessile, while in all others they are petiolate. In the majority

<sup>1</sup> Sond. in *Linnaea* 23: 86. 1850.

<sup>2</sup> Gürke in *K. Bot. Gart. Berlin Notiz.* 3: 74-76. 1900; *K. K. Nat. Hofm. Ann.* 26: 45. 1905.

<sup>3</sup> Pears. in *Fl. Cap.* 5: 194-207. 1901; *S. Afr. Phil. Soc. Trans.* 15: 176-180. 1905.

of cases the leaves are more or less ovate, obovate, or subrotund in outline with serrate margins. Incised and entire margins are more infrequent. There are three species in the genus with very distinct foliage. One species has dissected leaves, another has linear leaves with entire margins, while the third species has entire, thick, scabrous, spatulate leaves. These three species can be readily distinguished by their leaf characters. Hence the leaves furnish excellent characters for specific differentiation.

*Inflorescence*.—The inflorescence is racemose or rarely spicate, commonly terminal or occasionally axillary. The flowers are solitary, mostly short-pedicellate, rarely sessile, subtended by a bract, or by a bract and two bracteoles. The bracts are usually subulate or lanceolate, but in one species, *B. spathulata*, they are leaf-like. The racemes may be loosely or densely flowered. The character of the inflorescence is comparatively uniform and not of much value in specific determination.

*Pubescence*.—All the species except one are more or less pubescent, and the pubescence is relatively uniform as to kind. Some species are densely pubescent while others are nearly glabrous. The pubescence in most cases is of short straight hairs. *B. agrestis* is a notable exception and differs from all other species in having a pubescence of long white, somewhat flaccid hairs. The species can be distinguished by this character.

*Calyx*.—The calyx, although relatively constant throughout the genus, shows considerable diversity in the different species, and these calyx characters are of use in specific determination in several cases. The calyx is persistent, tubular, five-angled, and five-toothed. There is always one tooth (the posterior lobe) shorter than the other four. Sometimes this difference is very marked, and again it is scarcely noticeable. The calyx varies considerably in texture; some are thin and almost hyaline, while others are of a heavier texture. There is also variation in the length of the teeth.

*Corolla*.—The corolla is relatively constant throughout the genus, varying chiefly in size and color. The color is usually white, but blue, lilac, and rose-colored flowers are recorded. The corolla is funnel-shaped, somewhat bilabiate, with an elongated tube and a slightly unequal five-lobed, spreading limb.

*Stamens*.—The stamens are included, didynamous, and inserted on the corolla-tube. The lower pair (antero-lateral) is inserted at about the middle of the tube, opposite the sinuses of the anterior lip. The other pair (postero-lateral) is inserted at a little higher level opposite the sinuses of the posterior lip. The filaments are short. The anthers are ovate to subcordate with two parallel anther-sacs.

*Pistil*.—The oblong, bilocular, two-ovuled ovary is attached to the receptacle by a short gynophore. The style is long and filiform but included. The stigma is two-lobed. The anterior lobe is the larger and is somewhat subclavate-stigmatose, while the posterior lobe is aborted and tooth-like.

*Fruit*.—The fruit furnishes the most important characters used in specific determination in the genus. It separates into two distinct cocci at maturity or remains slightly coherent at the base. The cocci are always elongated, more or less beaked, and vary markedly in length. The dorsal surface is convex and usually more or less reticulately ridged. The commissural surface is either plane, ridged, or somewhat furrowed. The beak is very variable in length; it may be conspicuously different in color and texture from the rest of the fruit, and smooth or pubescent, whereas the body of the fruit is striated or reticulately ridged; or it may be quite inconspicuous, noticeable only by a slight contraction of its base. When the beak is greatly differentiated the edges of the fruit are found to have the same texture and surface characteristics as the beak. The fruit may be included in the calyx or exserted.

#### GENERIC RELATIONSHIPS

*Bouchea* belongs to the tribe *Verbeneae* and is obviously related to *Verbena* from which it was segregated by Chamisso on account of the separation of the fruit into two, instead of four, nutlets or cocci. It is related also to *Stachytarpheta* Vahl, but from that genus *Bouchea* is readily distinguished by the absence of a stout, deeply pitted rachis in which the flowers are more or less immersed. *Bouchea* is furthermore allied to the genus *Priva* Adans., particularly through the species *P. cuneato-ovatis* (Cav.) Rusby, but *Priva* in nearly all cases has an ampliate-globular, instead of a narrow tubular, fruiting calyx.



The immediate relationship of *Bouchea* is with *Chascanum* Meyer, and the two genera, as stated previously, were united by Schauer. A careful examination of a relatively large series of specimens, however, reveals important morphological differences which may be tabulated as follows:

*Bouchea* Cham.—Calyx tubular, 5-angled, occasionally slightly cleft at maturity, not inflated; fruit equalling or exceeding the persistent calyx; cocci mostly much longer than broad, distinctly beaked, not usually deeply excavated at the base (pl. 9, figs. 1-12; pl. 10, figs. 13-16; pl. 11, figs. 17-24).

*Chascanum* Meyer.—Calyx tubular, 5-angled, conspicuously splitting from apex to base at maturity, somewhat inflated; fruit included within the persistent calyx; cocci mostly less than twice as long as broad, not beaked, usually deeply excavated at the base (pl. 11, figs. 25-28).

#### GEOGRAPHICAL DISTRIBUTION

The genus *Bouchea* is somewhat limited in its distribution. As here defined, ten species are admitted to the genus and all but one occur in the Western Hemisphere, ranging from New Mexico to Bolivia or between 32° N. and approximately 20° S. The only recognized species of *Bouchea* from the Eastern Hemisphere is *B. pterygocarpa* which is found in Abyssinia.

Three species occur in the United States. *B. linifolia* is found in southwestern Texas, *B. spathulata* in western Texas and northern Mexico, while *B. prismatica*, which is the most widely distributed species, extends southward from New Mexico, through Mexico, Central America, and the West Indies, into Venezuela and Colombia. *B. prismatica* and *B. Nelsonii* are the only species known from Central America; the latter species has been collected only in southern Mexico and Guatemala. *B. dissecta*, the only species limited to Mexico in its distribution, is found in the northwestern part of that country. Three of the four species which are indigenous to South America are, as far as known, rather local in their distribution. *B. pseudochascanum* occurs in Ecuador, *B. agrestis* in Brazil, and *B. incisa* in Bolivia. *B. pseudogervaisii*, however, has a wider distribution. It is recorded from Peru, Bolivia, and Brazil.



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## ABBREVIATIONS

Abbreviations indicating the herbaria where specimens cited herein are deposited are as follows: US = United States National Herbarium; G = Gray Herbarium of Harvard University; M = Missouri Botanical Garden Herbarium; F = Field Museum of Natural History Herbarium; C = University of Chicago Herbarium (at the Field Museum); CC = Columbia College Herbarium (at the New York Botanical Garden).

## TAXONOMY

*Bouchea* Cham. in *Linnaea* 7: 252. 1832; Schauer in DC. Prodr. 11: 557. 1847, excl. *Chascanum*; Mart. Fl. Bras. 9: 197. 1847-1851; Bocq. Rev. Verb. 139. 1861-1863, excl. *Chascanum*; Benth. & Hook. Gen. Pl. 2: 1144. 1873-1874, excl. *Chascanum*; Briq. in Engler & Prantl, Nat. Pflanzenfam. 4<sup>m</sup>: 153. 1897, excl. *Chascanum*.

*Denisaea* Neck. Elem. 1: 306. 1790.

Annual or perennial plants, herbaceous to woody, densely pubescent to glabrous. Leaves usually petiolate, sometimes sessile, usually serrate to serrate-crenate, rarely incised, dissected,

or entire. Inflorescence racemose, rarely spicate, terminal, seldom axillary, elongate, loosely to densely flowered, bracteate. Flowers solitary, usually pedicellate. Bracts subulate, lanceolate or leaf-like. Calyx persistent, tubular, 5-ribbed, ribs terminating in 5 more or less unequal teeth. Corolla-tube funnelform, cylindrical, erect or curved; limb oblique, spreading, unequally 5-lobed, the two posterior lobes shorter than the anterior lobes. Stamens 4, didynamous, included; filaments short, inserted on the corolla-tube, the posterior pair of stamens inserted at the middle of the tube, the anterior pair inserted at a somewhat higher level; anthers 2-celled, ovate to subcordate. Ovary 2-locular, loculi 1-ovulate, oblong; style filiform; stigma 2-lobed, anterior lobe club-shaped, posterior lobe tooth-like, on a level with the anterior pair of stamens. Fruit dry, linear, beaked, included in the calyx or exserted, separating into two cocci at maturity; cocci totally separate or coherent at the base, dorsal surface more or less reticulately ridged, commissural surface plane, furrowed, or ridged, sometimes a little roughened.

Type species: *B. pseudogervais* (St. Hil.) Cham. in *Linnaea* 7: 253. 1832.

#### KEY TO THE SPECIES

- A. Leaves distinctly petiolate; petioles .5-4 mm. in length.
  - B. Beak of the fruit membranous-winged.....1. *B. pterygocarpa*
  - BB. Beak of the fruit not membranous-winged.
  - C. Beak oblong, emarginate.
  - D. Leaves ovate to subrotund, dentate to crenate-dentate, or lacinate-dentate.
    - E. Leaves lacinate-dentate.....2a. *B. prismatica* var. *laciniata*
    - EE. Leaves dentate to crenate-dentate.
      - F. Calyx 5-9 mm. long; beak 1.5 mm. or less in length.
        - G. Beak about 1.5 mm. long.....2. *B. prismatica*
        - GG. Beak about .5 mm. long....2b. *B. prismatica* var. *brevirostra*
      - FF. Calyx 9-15 mm. long; beak 2-6 mm. in length.
        - H. Beak 2-3 mm. long, glabrous or slightly pubescent.
          - .....2c. *B. prismatica* var. *longirostra*
        - HH. Beak 4-6 mm. long, distinctly pubescent....3. *B. Nelsonii*
      - DD. Leaves ovate, deeply dissected.....4. *B. dissecta*
    - CC. Beak somewhat obscure to distinctly attenuate and acute.
      - I. Plants conspicuously villous-hirsute.....5. *B. agrestis*
      - II. Plants not villous-hirsute.
    - J. Fruit exserted.
    - K. Calyx-teeth subulate.....6. *B. pseudogervais*

- KK. Calyx teeth triangular; calyx almost truncate  
at the apex.....7. *B. pseudochascanum*  
JJ. Fruit not exerted.....8. *B. incisa*  
AA. Leaves sessile.  
L. Leaves linear to narrowly lanceolate, thin,  
smooth.....9. *B. linifolia*  
LL. Leaves spatulate, thick, scabrous..10. *B. spathulata*

1. *B. pterygocarpa* Schauer in DC. Prodr. 11: 558. 1847;  
Engler, Pflanzenw. Ost.-Afr. A. 57 and C. 338. 1895; *ibid.* A.  
44. sphalm. *pterygosperma*.

Stem ligneous, 10-15 dm. high, branched; branches somewhat  
4-angled, glaucescent; leaves petiolate, ovate to ovate-elliptical,  
9-30 mm. long, 7-15 mm. broad, rather thick, somewhat un-  
equally serrate-dentate, obtuse to subacute at the apex, more or  
less cuneate at the base, scabrous-pubescent on both surfaces;  
petioles 5-15 mm. long; racemes terminal, subsessile, 8-42 cm.  
long, pubescent, closely flowered; flowers subsessile; bracts subu-  
late, 2-3 mm. long; calyx 8-9 mm. long, splitting longitudinally  
from apex to base at maturity, scabrous-pubescent, teeth very  
short, apex almost truncate; fruit about as long as the calyx,  
separating into two distinct cocci, dorsal surface slightly ridged,  
commissural surface with a central longitudinal ridge, roughened,  
excavated at the base, beak membranous-winged.

Distribution: Abyssinia.

Specimens examined:

Abyssinia: in the mountains near Adeganna, 11 April, 1839,  
*Schimper 1012* (US, M).

2. *B. prismatica* (Jacq.) Kuntze, Rev. Gen. Pl. 2: 502. 1891.  
*B. Ehrenbergii* Cham. in Linnaea 7: 253. 1832; Walp. Rep.  
4: 12. 1844; Torr. in U. S. & Mex. Bound. Surv. 126. 1859;  
Gray, Syn. Fl. N. Am., ed. 2, 2<sup>1</sup>: 334. 1886; Briq. in Engl. &  
Prantl, Nat. Pflanzenfam. 4<sup>te</sup>: 153. 1897.

*Verbena prismatica* Jacq. Coll. 2: 301. 1788; Icones Pl. Rar.  
2: t. 208. 1786-1793.

*Zapania prismatica* Lam. Encycl. Meth. 1: 59. 1791; Poir.  
Encycl. Meth. 8: 844. 1808.

*Stachytarpheta bifurca* Benth. Pl. Hartw. 21. 1839; Walp. Rep.  
4: 11. 1844.

Stem 1-6 dm. high, 4-angled, more or less pubescent, often furrowed, branched; leaves petiolate, ovate to subrotund, 2-8.5 cm. long, .5-4.5 cm. broad, mucronate-dentate to subcrenate, slightly pubescent on both surfaces, acute to somewhat obtuse at the apex, base entire, cuneate to subtruncate; racemes terminal, 8-25 cm. long, often loosely flowered; flowers small, subsessile; bracts lanceolate, 2-3 mm. long; calyx 7-9 mm. long, teeth nearly 2 mm. long; fruit separating into two distinct cocci, equalling or slightly exceeding the calyx, dorsal surface ridged, commissural surface somewhat furrowed, roughened, beak pronounced, about 1.5 mm. long, straight, emarginate.

Distribution: central and southern Mexico, West Indies to northern South America.

Specimens examined:

Tamaulipas: Tula, 1903, *Purpus* 485 (US).

Aguascalientes: Aguascalientes, 20 Aug., 1901, *Rose & Hay* 5949, 6229 (US).

Guanajuato: date lacking, *Dugès* 500 (G).

Vera Cruz: Wartenberg, near Tantoyuca, Prov. of Hausteca, coll. of 1858, *Ervendberg* 280 (G).

Puebla: Tehuacan, 1-2 Aug., 1901, *Rose & Hay* 5949 (US).

Oaxaca: Almaloyas, 14 July, 1910, *Rusby* 49 (US).

Yucatan: Progreso, date lacking, *Gaumer* 1139, 1160 (F).

Haiti: along roads, Port au Prince, 4 July, 1901, *Harshberger* 51 (US).

Santo Domingo: Puerto Plata, 26 April, 1906, *Raunkiaer* 1102 (US); Guayubin, Prov. de Monte Cristi, alt. 100 m. or less, 13-21 Feb., 1921, *Abbott* 958 (US); roadside, Haina, April, 1921, *Faris* 189, 199 (US); without locality, Oct., 1909, *Türkheim* 2532 (F, M, US, G).

Porto Rico: near Coamo siroci los Banos, 11 April, 1885, *Sintenis* 211 F (F, M, US, G); roadside, Coamo Springs, 22 Nov., 1899, *Goll* 689 (US); Coamo Springs, 1 July, 1901, *Underwood & Griggs* 585 (US); Coamo Springs, 24 Nov., 1902, *Heller* 6109 (F, M, G).

Culebra Island: waste places, Culebra, 3-12 March, 1906, *Britton & Wheller* 252 (US).

St. Thomas Island: Nov., *Eggers* 114 (G).

St. Croix Island: east end roadside, 9 June, 1897, *Ricksecker* 409 (M, F, US).

Curacao Island: 15 Nov., 1916, *Rose* 22012 (US).

Margarita Island: El Valle, 20 July, 1901, *Miller & Johnston* 205 (M, F, US, G).

Venezuela: between Caracas and La Guayra, alt. 600 m., 16 Sept., 1855, *Fendler* 853 (G); wet meadows, vicinity of El Valle, near Caracas, 28 Aug., 1921, *Pittier* 9720 (US, G); on slope near El Zigzag between Caracas and Puerto Cabello, 18 Oct., 1921, *Pittier* 72 (US); La Trinidad de Maracay, Aragua, alt. 440 m., Jan.-Feb., 1913, *Pittier* 5830, 5832 (US).

Colombia: open wayside, clay, east of Paso de Caramanta, Cauca Valley, Department of Antioquia, alt. 600-700 m., 20 Sept., 1922, *Pennell* 10825 (US).

Colombia: eastern side of Cauca Valley, La Manuelita, near Palmira, Cauca, alt. 1100-1302 m., Dec., 1905-Jan., 1906, *Pittier* 833 (US).

**2a. Var. *laciniata* Grenzebach, n. var.<sup>1</sup>**

Stems like the species, leaves ovate, about 4 cm. long, 1.5-2.5 cm. broad, margins distinctly incised, apex acute to acuminate, base cuneate to subtruncate.

Distribution: east central Mexico.

Specimen examined:

Vera Cruz: near Tantoyuca, Prov. of Huasteca, coll. of 1858, *Ervendberg* 102 (G, TYPE, photograph in M).

**2b. Var. *brevirostra* Grenzebach, n. var.<sup>2</sup>**

Stem, leaf, and raceme characters like the species; calyx 5-7.5 mm. long; fruit about equalling the calyx, or slightly exserted, beak about .5 mm. long, somewhat curved.

<sup>1</sup> *Bouchea prismatica* (Jacq.) Kuntze var. *laciniata* Grenzebach, var. nov., a forma typica recedit foliis ovatis, circiter 4 cm. longis, 1.5-2.5 cm. latis, laciniato-dentatis, acutis vel acuminatis, basi cuneatis vel subtruncatis.—Near Tantoyuca, Province of Huasteca, Vera Cruz, Mexico, coll. of 1858, *Ervendberg* 102 (G, TYPE, photograph in M).

<sup>2</sup> *Bouchea prismatica* (Jacq.) Kuntze var. *brevirostra* Grenzebach, var. nov., calyce 5-7.5 mm. longo; fructo calycem subaequant vel rarius excedenti; rostro circiter 5 mm. longo; aliter formae typicae species simillimum.—Collected at Pungato, vicinity of Morelia, State of Michoacan, Mexico, alt. 2100 m., 9 Aug., 1909, *Arsène* 2857 (M, TYPE, US).

Distribution: New Mexico, southward to Salvador, also in the Barbados.

Specimens examined:

New Mexico: coll. of 1851–1852, *Wright 1508* (US).

Sonora: coll. of 1850–1852, *Thurber 1094* (F, G).

Chihuahua: hills and plains near Chihuahua, 2 Sept., 1886, *Pringle 994* (M); and Aug.–Sept., 1885, *Pringle 325* (G, F); Cerro de Guadeloupe, alt. 2250 m., 3 Sept., 1899, *Pringle 7941* (F, G).

Durango: damp, rocky soil, Santiago Papasquiara, Apr. and Aug., 1896, *Palmer 416* (US, G, F, M).

San Luis Potosi: region of San Luis Potosi, alt. 1800–2400 m., coll. of 1878, *Parry & Palmer 716* (M, G).

Jalisco: Guadalajara, July, 1886, *Palmer 261* (G, US).

Colima: Colima, July, 1897, *Palmer 104* (US).

Michoacán: Mont. Zacoalco, 10 July, 1865–1866, *Bourgeau 545* (US, G); Loma del Zapote, vicinity of Morelia, alt. 1950 m., 25 July, 1912, *Arsène 8489* (US); Punguato, vicinity of Morelia, alt. 2000 m., 16 July, 1909, *Arsène 3040* (M, G, US); Punguato, vicinity of Morelia, alt. 2100 m., Aug., 1909, *Arsène 2857* (M, TYPE, US); Punguato, Morelia, alt. 1950 m., 8 Sept., 1909, *Arsène 4* (F).

Guanajuato: coll. of 1909, *Furness*, without number (F).

Queretaro: near San Juan del Rio, Aug., 1905, *Rose, Painter & Rose 9570* (US); locality not indicated, alt. 1850 m., July, 1914, *Arsène 9997* (M, US, G).

Mexico: Tlalpam, valley of Mexico, 20 Aug., 1896, *Harshberger 152* (G).

Puebla: vicinity of San Luis Tultitlanapa, near Oaxaca, June, 1908, *Purpus 3405* (F, M, US, G).

Oaxaca: valley of Etta, Sept., 1895, *Alvarez 747* (G).

Guatemala: Santa Rosa, Department of Santa Rosa, alt. 900 m., June, 1892, *Smith 2965* (US, G).

## 2c. Var. *longirostra* Grenzebach, n. var.<sup>1</sup>

<sup>1</sup> *Bouchea prismatica* (Jacq.) Kuntze var. *longirostra* Grenzebach, var. nov., calyce 7.5–10 mm. longo; fructo 9–11 mm. longo, rostro erecto, 2–3 mm. longo, exserto.—Collected along Hope Road, Jamaica, alt. 120 m., 14 Nov., 1914, *Harris 11792* (M, TYPE, F, G).



Salvador: dry slope, vicinity of San Vicente, Department of San Vicente, alt. 350–500 m., 2–11 March, 1922, *Standley 21620* (US).

Stem and leaf characters like the species; calyx 7.5–10 mm. long; fruit 9–11 mm. long, beak 2–3 mm. long, straight, exserted.

Distribution: southern Mexico, Bahamas and West Indies to northern South America.

Specimens examined:

Oaxaca: Cuicatlan, 15 July, 1895, *Smith 411* (G); vicinity of Cuicatlan, alt. 540–750 m., 8–24 Oct., 1894, *Nelson 1597* (US).

Yucatan: 17 March, 1903, *Seler 3957* (F, G).

New Providence: waste ground, Fort Charlotte, 14 Sept., 1904, *Britton & Brace 782* (F).

Cat Island: waste lands, the Bight and vicinity, 1–6 March, 1907, *Britton & Millspaugh 5796* (F).

Cuba: damp ground, Havana, 11 May, 190–, *Curtiss & West*, without number (F); Cienegñith, district of Cienfuegos, Prov. of Santa Clara, 17 June, 1895, *Combs 154* (F, G, M, C); waste grounds, vicinity of Tiffin, Camaguey, 14–17 Oct., 1909, *Shafer 2861* (US); in orange grove, valley of Rio Matamoras, south of Halguin, Oriente, 14 April, 1909, *Shafer 1364* (F); Santiago de las Vegas, 15–20 March, 1905, *Hitchcock*, without number (F); Santiago de las Vegas, 30 June, 1904, *Baker & Wilson 524* (F, US); low ground, Tueabanda, 21 May, *Wright 3660* (US).

Jamaica: Hope Road, alt. 120 m., 14 Nov., 1914, *Harris 11792* (M, TYPE, F, G); Port Royal, 18 Dec., 1890, *Hitchcock*, without number (M); streets of Kingston, 9 Dec., 1890, *Hitchcock*, without number (M); along the railroad between Kingston and Gregory Park, sea level, 22 Feb., 1920, *Maxon & Killip 314* (US); exact locality not indicated, coll. of 1850, *Alexander*, without number (US).

Haiti: open waste places, vicinity of Pikmi, Gonave Island, 5–9 July, 1920, *Leonard 5219* (US); in cultivated fields, vicinity of St. Marc, near sea level, 25–28 Feb., 1920, *Leonard 2981* (G, US); vicinity of Port au Prince, 21–23 Feb., 1920, *Leonard 2852* (US).

Porto Rico: limestone, La Vigia Ponce, 14 March, 1915, *Britton, Cowell & Brown 5378* (F, M).



Venezuela: in savannas or in wooded gorges, lower Cotiza, near Caracas, alt. 800–1200 m., June, 1918, *Pittier 7887* (US).

3. *B. Nelsonii* Grenzebach, n. sp.<sup>1</sup>

Herbaceous, more or less pubescent throughout, especially above; stems 2.5–6 dm. high, terete below, 4-angled and furrowed above, sparingly branched; leaves petiolate, ovate to subrotund, 2–6 cm. long, 1–4.5 cm. broad, mucronate-dentate, acute to obtuse at the apex, narrowed slightly into the petiole or almost truncate at the base, pubescent on both surfaces, especially along the nerves; inflorescence racemose, terminal or axillary, usually densely flowered, 10–15 cm. long, .8–1 cm. broad; flowers short-pedicellate; bracts linear-lanceolate, about 5 mm. long, pubescent; calyx erect and narrow, 13–15 mm. long, pubescent; fruit separating into two distinct cocci at maturity, 11–16 mm. long, dorsal surface somewhat ridged, commissural surface plane, a little rough, beak about one-third the length of the entire fruit, 4–6 mm. long, slightly pubescent at the tip.

Distribution: southern Mexico and Guatemala.

Specimens examined:

Oaxaca and Chiapas: between Topana, Oaxaca, and Tonalá, Chiapas, alt. 60–150 m., 1–3 Aug., 1895, *Nelson 2867* (US, TYPE, G, photograph and fragments in M).

Guatemala: Zacapa, alt. 180 m., 24 Jan., 1905, *Deam 173* (G), slender form.

This species resembles *B. prismatica* (Jacq.) Kuntze to which the specimens cited have been referred hitherto, but it differs in having longer fruit, with a distinctly longer and pubescent beak,

<sup>1</sup> *Bouchea Nelsonii* Grenzebach, sp. nov., herbacea plus minusve pubescens; caulibus 2.5–6 dm. altis inferne teretibus superne quadrangularibus sulcatisque, parce ramosis; foliis petiolatis, ovatis vel subrotundatis, 2–6 cm. longis, 1–4.5 cm. latis, mucronato-dentatis, acutis vel obtusis, basi cuneatis vel subtruncatis, utrinque pubescentibus; inflorescentiis racemosis, terminalibus vel axillaribus racemis 10–15 cm. longis, .8–1 cm. latis; floribus crebre brevi-pedicellatis; bracteis lineari-lanceolatis, circiter 5 mm. longis, hirtellis; calyce erecto, plicato-angulato, 13–15 mm. longo, hirtello, dentibus 5 subulatis, inaequalibus; fructo exserto maturitate in 2 distincte cocci sponte secedens, coccis linearibus, 11–16 mm. longis, dorso striatis vel parce reticulato-jugis, commissura plana verruculosa, rostro 4–6 mm. longo ad apicem parce pubescens.—Between Topana, Oaxaca and Tonalá, Chiapas, Mexico, alt. 60–150 m., Aug. 1–3, 1895, *Nelson 2867* (US, TYPE, G, photograph and fragments in M).

longer and pubescent calyx, and usually a stouter, denser, and broader inflorescence. The entire plant, furthermore, is more pubescent than *B. prismatica*.

4. *B. dissecta* Wats. in Proc. Am. Acad. 24: 68. 1889.

An annual, distinctly herbaceous, slender, very finely puberulent to glabrous; stems 4-6.5 dm. high, 4-angled, sulcate; leaves ovate, 2-7 cm. long, 1-4 cm. broad, thin, pinnately cleft nearly to the midrib, the narrow segments entire, or 1-3-toothed, minutely pubescent; racemes terminal, 10-30 cm. long, slender, loosely flowered; flowers short-pedicellate; bracts subulate, only a little longer than the pedicels; calyx 7-8 mm. long, shortly toothed, slightly pubescent, thin; corolla white; fruit 10-12 mm. long, about one-third longer than the calyx, conspicuously long-beaked, beak 3.5-4 mm. long, dorsal surface longitudinally ridged, commissural surface somewhat furrowed, smooth.

Distribution: northwestern Mexico.

Specimens examined:

Sonora: rocky ridges, Guaymas, Oct., 1887, *Palmer 259* (G, TYPE); Agiabampo, 3-5 Oct., 1890, *Palmer B* (G).

Sinaloa: Culiacan, 27 Aug.-15 Sept., 1891, *Palmer 1485* (G, US); San Augustin, San Ignacio, coll. of 1921, *Ortega 621* (US).

5. *B. agrestis* Schauer in DC. Prodr. 11: 558. 1847, and in Mart. Fl. Bras. 9: 197. 1847-1851.

An annual, villous-hirsute in the younger stages, more or less glabrate; branches somewhat 4-angled; leaves short-petiolate, obovate, elliptical-oblong, 1.5-4 cm. long, 1-1.7 cm. broad, acutely serrate from the middle of the leaf to the apex, entire towards the base, attenuate on the petiole, villous-hirsute; racemes terminal, slender, loosely flowered; flowers pedicellate; bracts linear, 5-6 mm. long; calyx 7-9 mm. long, hirsute, teeth long; corolla lilac to rose; fruit separating into two distinct cocci, 6.5-8 mm. long, included within the calyx, beak long, attenuate, slightly pubescent, dorsal surface distinctly ridged, commissural surface plane, smooth.

Distribution: Brazil.

Specimen examined:

Brazil: vicinity of Bahia, date lacking, *Blanchet 3731* (M).

6. *B. pseudogervae* (St. Hil.) Cham.<sup>1</sup> in *Linnaea* 7: 253. 1832; Walp. Rep. 4: 11. 1844; Schauer in DC. Prodr. 11: 557. 1847; and in Mart. Fl. Bras. 9: 195. 1847-1851.

*Verbena pseudogervae* St. Hil. Pl. Us. des Bres. pp. 1-4. t. 40. 1824-1828.

(?) *Verbena fluminensis* Vellozo,<sup>2</sup> Fl. Flum., t. 38. 1827.

Stem 6-9 dm. high, somewhat ligneous, stout, almost glabrous, below terete; branches usually 4-angled, glabrous to slightly pubescent; leaves petiolate, ovate to elliptical-oblong, 6-10 cm. long, 2.5-5 cm. broad, membranous, coarsely mucronate-dentate, acuminate, entire and cuneate at the base, essentially glabrous on both surfaces, dark green above, pale beneath; inflorescence racemose, terminal, 10-30 cm. long, glabrous or slightly pubescent; flowers short-pedicellate, almost sessile; bracts linear-lanceolate, about 5 mm. long; bracteoles about one-third as long as the bracts; calyx 10-13 mm. long, finely pubescent; fruit of two cocci coherent at the base, cocci almost cylindrical, slightly exerted beyond the calyx, beak short, obscure, only slightly contracted at the base, dorsal surface ridged from base to apex, commissural surface plane or slightly convex, smooth.

Distribution: Brazil.

Specimens examined:

Peru: in hedge-rows, La Merced, 19-24 Aug., 1923, *Macbride* 5304 (F).

Bolivia: Junction of Rivers Beni and Madre de Dias, Aug., 1886, *Rusby* 915 (F, M, US, G); near Cochabamba, 1891, *Bang* 2001 (CC).

Brazil: Minas Geraes, 31 Oct., 1856. *Regnell* 340 (US).

7. *B. pseudochascanum* (Walp.) Grenzebach, n. comb.

*B. laetevirens* Schauer<sup>3</sup> in DC. Prodr. 11: 557. 1847, and in Mart. Fl. Bras. 9: 196. 1847-1851.

<sup>1</sup> Examination of specimens of *B. pseudogervae* from Bolivia and Peru show them to have a slightly longer and more attenuate beak than the specimens studied from Brazil, but this difference is not great enough in the material at hand to warrant even varietal differentiation.

<sup>2</sup> Although Vellozo used the specific name *fluminensis* in referring to this species in his 'Flora Fluminensis' in 1827, yet the illustration is unaccompanied by a description, and it seems advisable, therefore, to retain the name *pseudogervae*.

<sup>3</sup> It is impossible to separate *B. laetevirens* and *B. incrassata* specifically. The

(?) *B. incrassata* Lange, Ind. Sem. Hort. Haun. 31. 1870; Bot. Tidssk. 8: 3. 1874-1876.

*Stachytarpheta pseudochascanum* Walp. Rep. 4: 11. 1844.

Stems somewhat ligneous, terete, glabrous at the base; branches obtusely 4-angled, erect-spreading, pubescent; leaves short-petiolate, ovate to subrotund or elliptical-ovate, 2-7 cm. long, 1.5-3 cm. broad, serrate, acute to subobtuse, entire, cuneate at the base, young leaves pubescent on both surfaces, glabrate except along the nerves beneath; petioles 6-12 mm. long; inflorescence racemose, terminal or axillary, 14-30 cm. long, pubescent; flowers short-pedicellate; bracts subulate, short, a little longer than the pedicels; bracteoles minute; calyx about 8-9 mm. long, almost truncate at the apex, teeth very short, triangular, slightly pubescent, ciliate, occasionally splitting along one side; fruit separating into two cocci at maturity except at the slightly coherent base, about one-third longer than the calyx, beak short, attenuate, dorsal surface ridged, commissural surface plane, almost smooth.

Distribution: Ecuador.

Specimens examined:

Ecuador: Caragues, 23 June, 1923, *Anthony & Tate 87* (US).

8. *B. incisa* Rusby in Bull. N. Y. Bot. Gard. 4: 432. 1907.

Stem somewhat ligneous, glabrous to slightly pubescent, terete below, purplish, finely striate, branched; branches somewhat 4-angled; leaves short-petiolate, ovate, 5-12 cm. long, 2-4 cm. broad, upper half somewhat incisely serrate toward the apex or rarely entire, acuminate, entire at the apex and base, glabrous or slightly pubescent on both surfaces, especially along the nerves on the under side, green above, pale beneath; racemes terminal, 1-3 dm. long; flowers shortly and stoutly pedicellate; bracts about 3 mm. long, subulate, pubescent; bracteoles about one-third as long as the bracts; calyx about 1.5 cm. long, pubescent, cylindrical, recurved in anthesis, erect in fruit; corolla-tube nearly 2 cm. long, strongly recurved, limb broad; fruit about 1.5 cm. long, the two cocci slightly coherent at the base, beak short,

descriptions of the two are practically the same, and the excellent illustrations in Bot. Tidssk. 8: t. 2. 1874-1876, and in Mart. Fl. Bras. 9: t. 33. 1847-1851, show them to be the same in all essential details.

rather inconspicuous, dorsal surface slightly ridged, commissural surface plane, smooth.

Distribution: Bolivia.

Specimens examined:

Bolivia: without exact locality and date of collection, *Bang* 2226 (CC, TYPE M, G, F).

9. *B. linifolia* Gray in Am. Jour. Sci. II. 16: 98. 1853; Torr. in U. S. & Mex. Bound. Surv. 2: 126. 1859; Gray, Syn. Fl., ed. 2, 2<sup>1</sup>: 335. 1886; Coult. Bot. Western Texas, 326. 1891-1894.

Stem simple or fastigately branched from a somewhat woody base, 3-6 dm. high, glabrous; branches rigid, striate, sulcate, very leafy; leaves sessile or nearly so, linear to linear-lanceolate, 2-4.5 cm. long, 2-5 cm. broad, acute at both ends; racemes terminal or axillary, 4-15 cm. long, loosely flowered; pedicels about 2 mm. long; bracts linear to linear-lanceolate, 2-3 mm. long, somewhat longer than the pedicels; calyx 10-13 mm. long, slender, glabrous; corolla large, limb wide-spreading; fruit separating into two distinct cocci, barely included in the calyx, pubescent along the margin, dorsal surface ridged, commissural surface smooth or nearly so, beak pointed, villous.

Distribution: western and southern Texas.

Specimens examined:

Texas: west Texas to El Paso, New Mexico, May-Oct., 1849. *Wright* 449 (US); valley of the Rio Grande below Donana, date lacking, *Emory* 814 (US); dry calcareous hillsides, Montell, Uvalde County, 15 Oct., 1917, *Palmer* 13007 (M); Neuces River, date lacking, *Havard* 1383 (M); San Pedro, coll. of 1851-1852, *Wright* 1509 (M, US).

10. *B. spathulata* Torr. in U. S. & Mex. Bound. Surv. 2: 126. 1859; Gray, Syn. Fl., ed. 2, 2<sup>1</sup>: 335. 1886; Coult. Bot. Western Texas, 326. 1891-1894.

Distinctly ligneous, 3-6 dm. high, usually branched; branches terete, softly pubescent, very leafy; leaves sessile, obovate, spatulate, 5-18 mm. long, 3-7 mm. broad, entire, obtuse, acute at the base, coriaceous, scabrous; spikes terminal, short, loosely flowered; flowers divergent from the rachis; bracts leaf-like, oblanceolate, about three-fourths the length of the calyx; calyx

8-11 mm. long, scabrous-pubescent; corolla much exceeding the calyx; fruit separating into two distinct cocci at maturity, not exerted above the calyx, dorsal and commissural surfaces smooth, beak pointed, pubescent, margins of the fruit also pubescent.

Distribution: western Texas and northern Mexico.

Specimens examined:

Texas: mountains east of Tornillo Creek, Aug., 1883, *Havard* 96 (US); Canyon Boquillas, 3 Aug., 1919, *Hanson* 718 (US).

Coahuila: Sierra de la Poila, Oct., 1910, *Purpus* 4750 (F, M, G).

#### LIST OF EXCLUDED SPECIES

*Bouchea adenostachya* Schauer in DC. Prodr. 11: 560. 1847 = Chascanum.

*B. caespitosa* Pearson in Trans. S. Afr. Phil. Soc. 15: 178. 1904 = Chascanum.

*B. cernua* Schauer in DC. Prodr. 11: 559. 1847 = Chascanum cernuum Meyer, Comm. 1: 276. 1897.

*B. copiapensis* Gay, Hist. Chile 5: 26. 1849 = *Priva cuneato-ovata* (Cav.) Rusby.

*B. cuneifolia* Schauer in DC. Prodr. 11: 559. 1847 = Chascanum cuneifolium Meyer, Comm. 1: 276. 1897.

*B. garepensis* Schauer in DC. Prodr. 11: 560. 1847 = Chascanum garepense Meyer, Comm. 1: 277. 1897.

*B. glandulifera* Pearson in Fl. Cap. 5: 204. 1901. = Chascanum.

*B. Hanningtonii* Oliver in Hook. Ic. Pl. t. 1446 = Chascanum.

*B. hederacea* Sond. in Linnaea 23: 86. 1850 = Chascanum.

*B. incisa* Pearson in Trans. S. Afr. Phil. Soc. 15: 180. 1904 = Chascanum.

*B. integrifolia* Pearson in Trans. S. Afr. Phil. Soc. 15: 179. 1904 = Chascanum.

*B. Krookii* Guerke in Ann. Nat. Hofmus. 20: 45. 1905 = Chascanum.

*B. latifolia* Harv. Thes. Cap. 2: 57. = Chascanum.

*B. longipetala* Pearson in Fl. Cap. 5: 199. 1901 = Chascanum.

*B. marrubiiifolia* Schauer in DC. Prodr. 11: 558. 1847 = Chascanum.



*B. namaquana* Bolus, ex Pearson in Fl. Cap. 5: 204. 1901 = Chascanum.

*B. pinnatifida* Schauer in DC. Prodr. 11: 560. 1847 = Chascanum pinnatifidum Meyer, Comm. 1: 277. 1897.

*B. pumila* Schauer in DC. Prodr. 11: 500. 1847 = Chascanum pumilum Meyer, Comm. 1: 277. 1897.

*B. rariflora* Chiov. in Ann. Bot. Roma 9: 127. 1911 = Chascanum.

*B. Schlechteri* Guerke in Notiz. K. Bot. Gart. Berlin 3: 75. 1903 = Chascanum.

*B. sessilifolia* Vatke in Linnaea 43: 529. 1880-1882 = Chascanum.

*B. Wilmsii* Guerke in Notiz. K. Bot. Gart. Berlin 3: 74. 1903 = Chascanum.

#### . DOUBTFUL SPECIES

*B. hyderabadensis* Walp. Rep. 4: 12. 1844, is a species not sufficiently known for definite specific determination.

#### LIST OF EXSICCATAE CITED

Distribution numbers are in *italics*. The numbers in parentheses are those of the species in the present revision. Collections distributed without numbers are indicated by a dash.

- |  |  |
|--|--|
| Abbott, W. L. <i>958</i> (2).  | Dugès, A. <i>500</i> (2).                                    |
| Alexander, R. C.—(2c).   | Eggers, Baron H. F. A. <i>114</i> (2).                       |
| Alvarez, C. <i>747</i> (2b).   | Emory, W. H. <i>814</i> (9).                                 |
| Anthony, H. E. & Tate, G. H. H. <i>87</i> (7).   | Ervendberg, L. C. <i>102</i> (2a); <i>280</i> (2).           |
| Arsène, Bro. G. <i>4</i> , <i>2857</i> , <i>3040</i> , <i>8489</i> , <i>9997</i> (2b). | Faris, J. A. <i>189</i> , <i>199</i> (2).                    |
| Baker, C. E. & Wilson, <i>524</i> (2c).  | Fendler, A. <i>853</i> (2).                                  |
| Bang, A. M. <i>2001</i> (6a); <i>2226</i> (8).   | Furness, D. R.—(2b).   |
| Blanchet, J. S. <i>3731</i> (5).   | Gaumer, G. F. <i>1139</i> , <i>1160</i> (2).                 |
| Bourgeau, E. <i>545</i> (2b).  | Goll, G. P. <i>689</i> (2).                                  |
| Britton, N. L. & Brace, L. J. K. <i>732</i> (2c).                                      | Hanson, H. C. <i>718</i> (10).                               |
| Britton, N. L., Cowell, J. F. & Brown, S. <i>5378</i> (2c).                            | Harris, Wm. <i>11792</i> (2c).                               |
| Britton, N. L. & Millsbaugh, C. F. <i>5796</i> (2c).                                   | Harshberger, J. W. <i>51</i> (2); <i>152</i> (2b).           |
| Britton, N. L. & Wheller, W. M. <i>252</i> (2).  | Havard, V. <i>96</i> (10); <i>1383</i> (9).                  |
| Combs, R. <i>154</i> (2c).   | Heller, A. A. <i>6109</i> (2).                               |
| Curtis & West,—(2c).   | Hitchcock, A. S.—(2c).                                       |
| Deam, C. C. <i>173</i> (3).  | Leonard, E. C. <i>2852</i> , <i>2981</i> , <i>5219</i> (2c). |
|  | Macbride, J. F. <i>5304</i> (6).                             |
|  | Maxon, W. P. & Killip, E. P. <i>314</i> (2c).                |
|  | Miller, O. O. & Johnston, J. R. <i>206</i> (2).              |
|  | Nelson, E. W. <i>1597</i> (2c); <i>2807</i> (3).             |



- Ortega, J. G. 621 (4).  
 Palmer, E. 104, 261, 416, (2b); B, 259, 1485 (4).  
 Palmer, E. J. 13007 (9).  
 Parry, C. C. & Palmer, Ed. 716 (2b).  
 Pennell, F. W. 10825 (2).  
 Pittier, E. 72 (2).  
 Pittier, H. 833, 5830, 5832, 9720 (2); 7887 (2c).  
 Pringle, C. G. 325, 994, 7941 (2b).  
 Purpus, C. A. 485 (2); 3405 (2b); 4750 (10).  
 Raunkiaer, C. 1102 (2).  
 Regnell, A. A. 340 (6).  
 Ricksecker, Mrs. Rev. J. J. 409 (2).  
 Rose, Mr. & Mrs. J. N. 22012 (2).  
 Rose, J. N. & Hay, R. 5949, 6229 (2).  
 Rose, J. N., Painter, J. H. & Rose, J. S. 9570 (2b).  
 Rusby, H. H. 49 (2); 915 (6a).  
 Schimper, W. 1012 (1).  
 Schumann, W. 232 (2).  
 Seler, Caec. and E. E. 3957 (2c).  
 Shafer, J. A. 1364, 2361 (2c).  
 Sintenis, P. 211F (2).  
 Smith, J. D. 2965 (2b).  
 Smith, L. C. 411 (2c).  
 Standley, P. C. 21620 (2b).  
 Thurber, G. 1094 (2b).  
 Underwood, L. M. & Griggs, R. F. 535 (2).  
 von Türckheim, H. 2532 (2).  
 Wright, C. 449, 1509 (9); 1508, (2b); 3680 (2c).

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New species, varieties, and combinations are printed in **bold face type**; synonyms in *italics*; and previously published names in ordinary type.

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## EXPLANATION OF PLATE

## PLATE 8

Geographical distribution of the genus *Bouchea*.

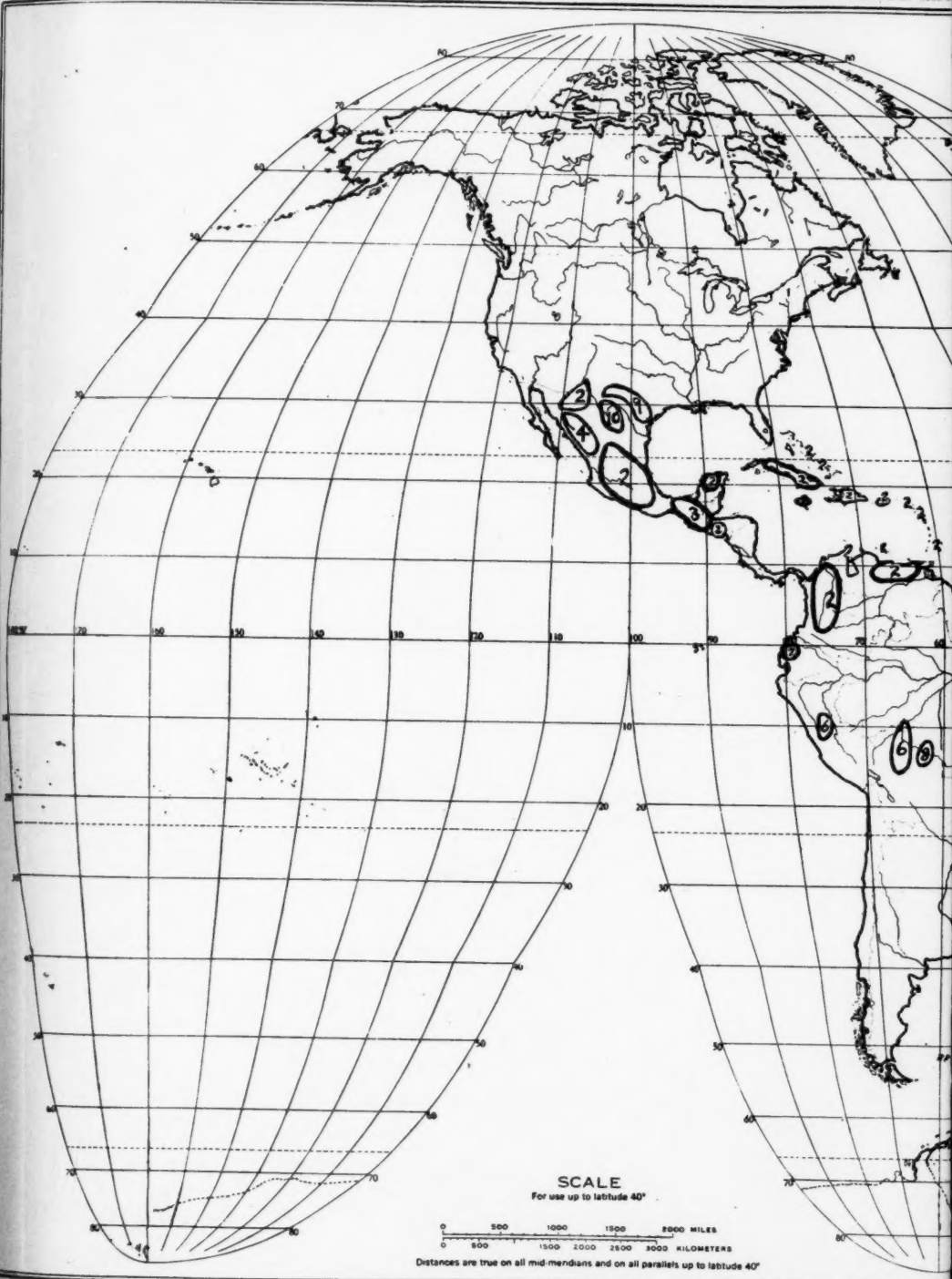
The generic distribution of the genus *Bouchea* is shown by the outlined areas. The specific distribution is indicated by numerals which correspond to the numbers of the various species as treated in this revision.

- |                           |                              |
|---------------------------|------------------------------|
| 1. <i>B. pterygocarpa</i> | 6. <i>B. pseudogervaisii</i> |
| 2. <i>B. prismatica</i>   | 7. <i>B. pseudochascanum</i> |
| 3. <i>B. Nelsonii</i>     | 8. <i>B. incisa</i>          |
| 4. <i>B. dissecta</i>     | 9. <i>B. linifolia</i>       |
| 5. <i>B. agrestis</i>     | 10. <i>B. spathulata</i>     |

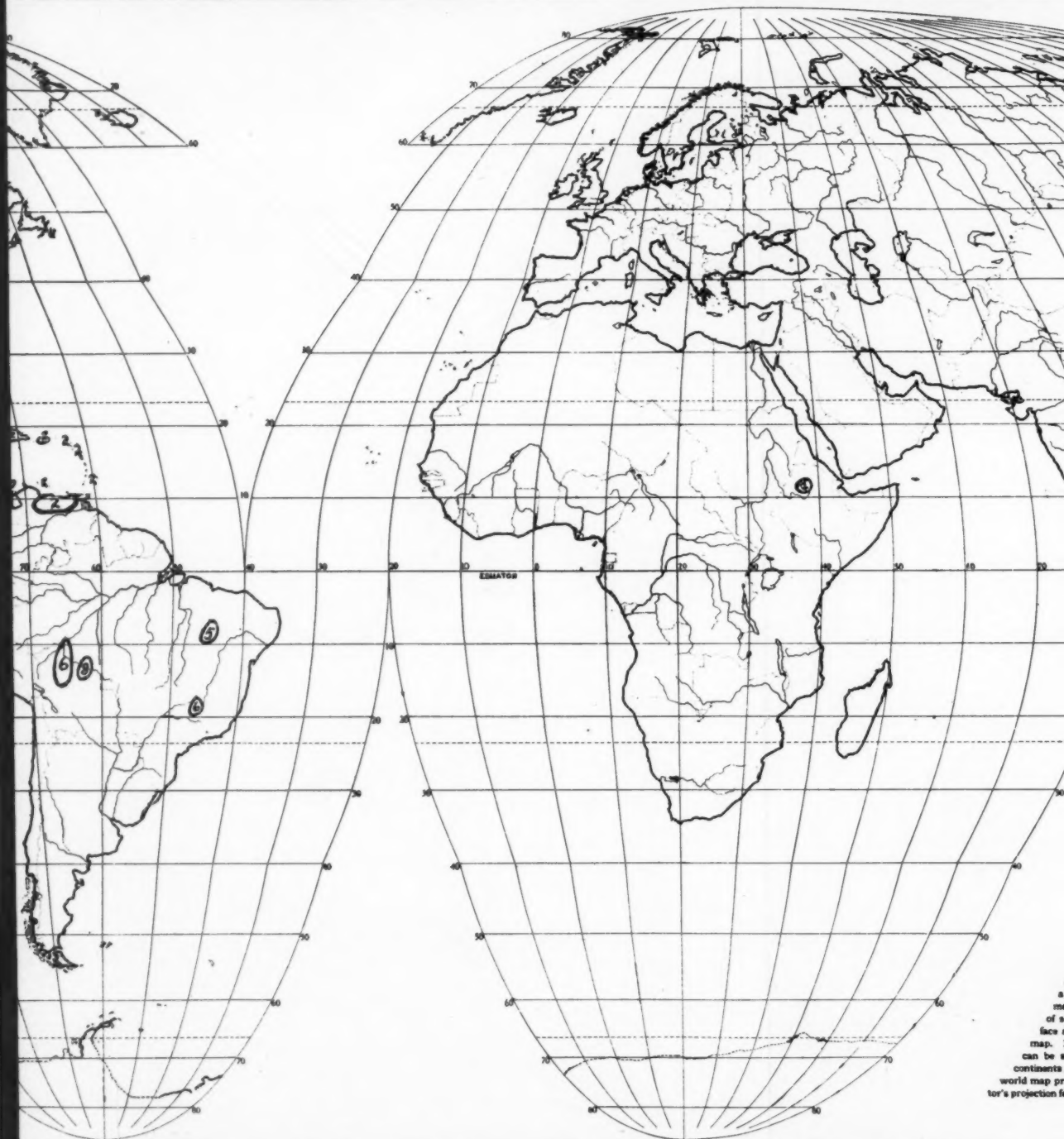
HERBARIUM  
OF THE  
MISSOURI BOTANICAL GARDEN  
GEORGE ENGELMANN PAPERS







BASE MAPS AND GRAPHS. THE WORLD ON GOODE'S HOMOLOGINE PROJECTION, INTERRUPTED, FOR THE CONTINENTS

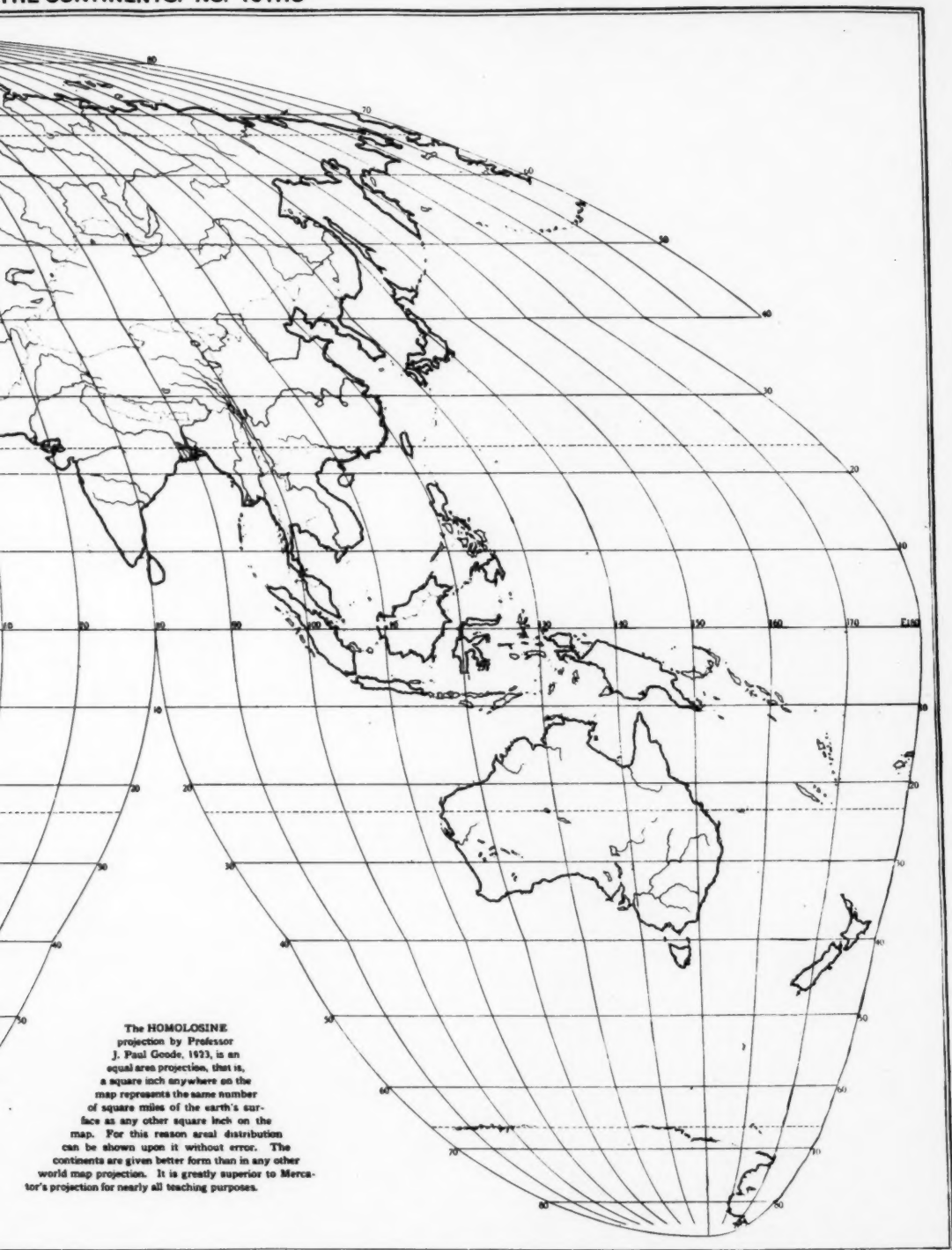


For class use in Geography, History, Civics, Economics, etc. Prepared by J. Paul Goode Published by the University of Chicago Press, Chicago.  
Copyright 1923, by The University of Chicago

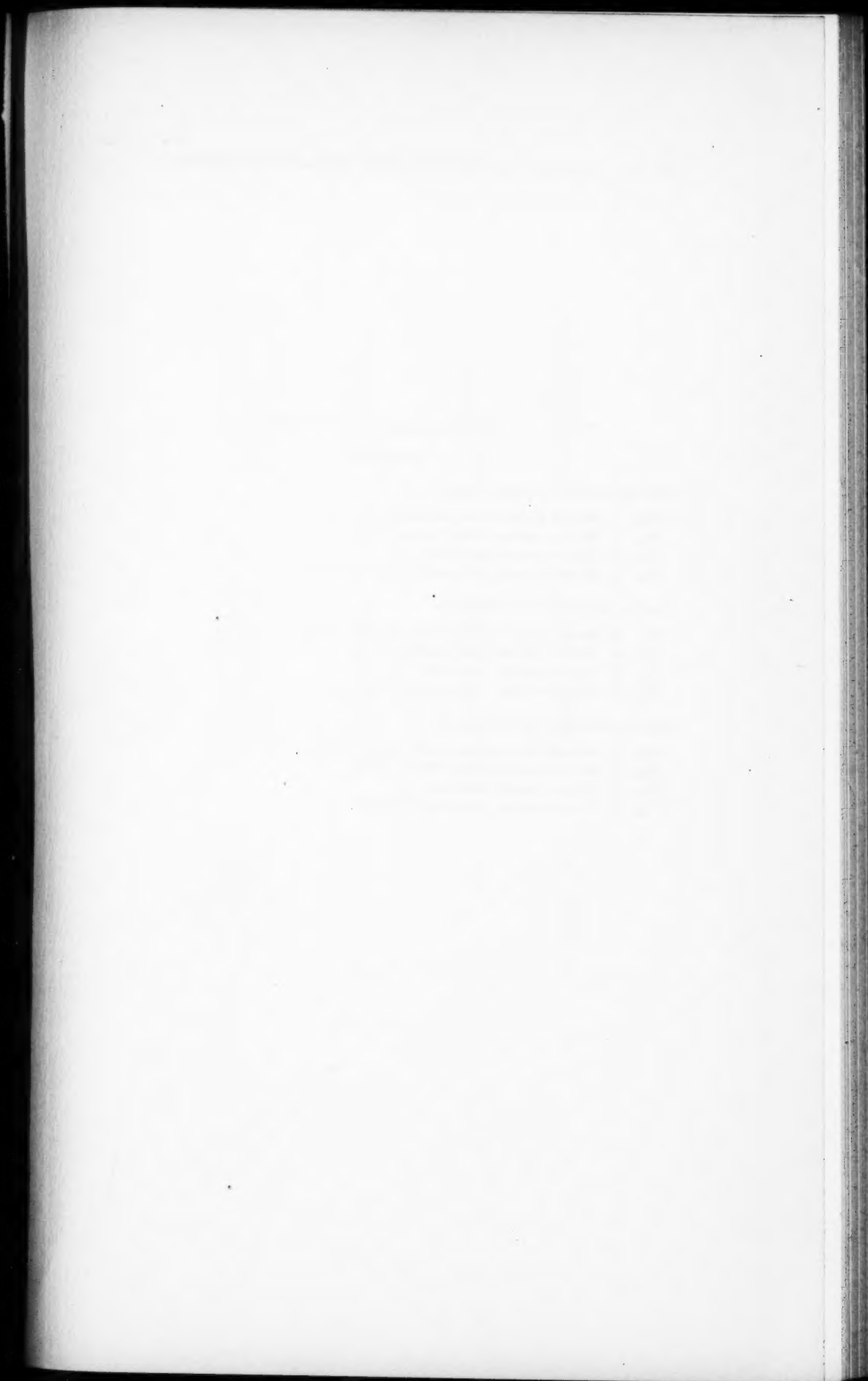
GRENZEBACH—REVISION OF BOUCHEA



THE CONTINENTS. NO. 101HC







## EXPLANATION OF PLATE

## PLATE 9

*Bouchea prismatica* (Jacq.) Kuntze

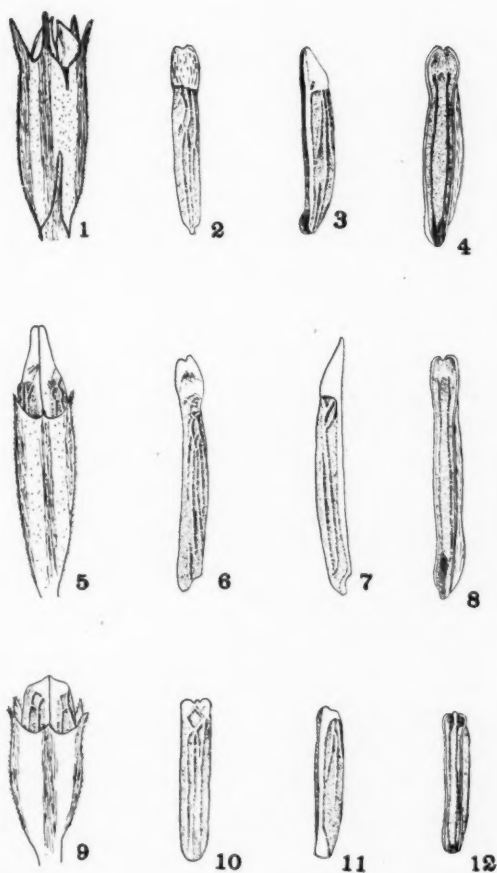
- Fig. 1. Mature cocci within persistent calyx,  $\times 5$ .  
Fig. 2. Mature coccus, dorsal surface,  $\times 5$ .  
Fig. 3. Mature coccus, side view,  $\times 5$ .  
Fig. 4. Mature coccus, commissural surface,  $\times 5$ .

*Bouchea prismatica* var. *longirostra*

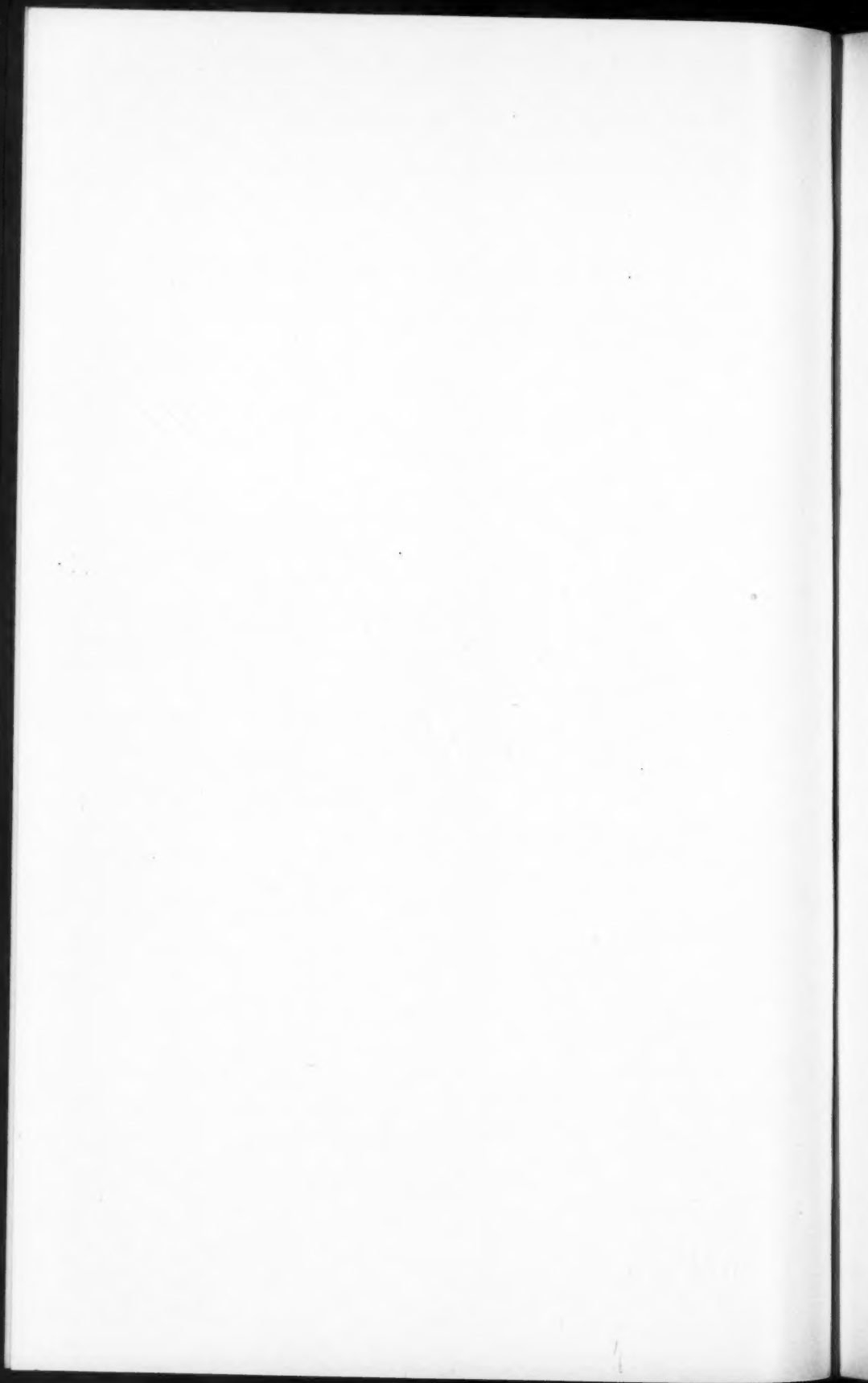
- Fig. 5. Mature cocci within persistent calyx,  $\times 5$ .  
Fig. 6. Mature coccus, dorsal surface,  $\times 5$ .  
Fig. 7. Mature coccus, side view,  $\times 5$ .  
Fig. 8. Mature coccus, commissural surface,  $\times 5$ .

*Bouchea prismatica* var. *brevirostra*

- Fig. 9. Mature cocci within persistent calyx,  $\times 5$ .  
Fig. 10. Mature coccus, dorsal surface,  $\times 5$ .  
Fig. 11. Mature coccus, side view,  $\times 5$ .  
Fig. 12. Mature coccus, commissural surface,  $\times 5$ .



GRENZEBACH—REVISION OF BOUCHEA







## EXPLANATION OF PLATE

## PLATE 10

## A

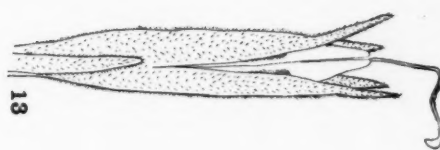
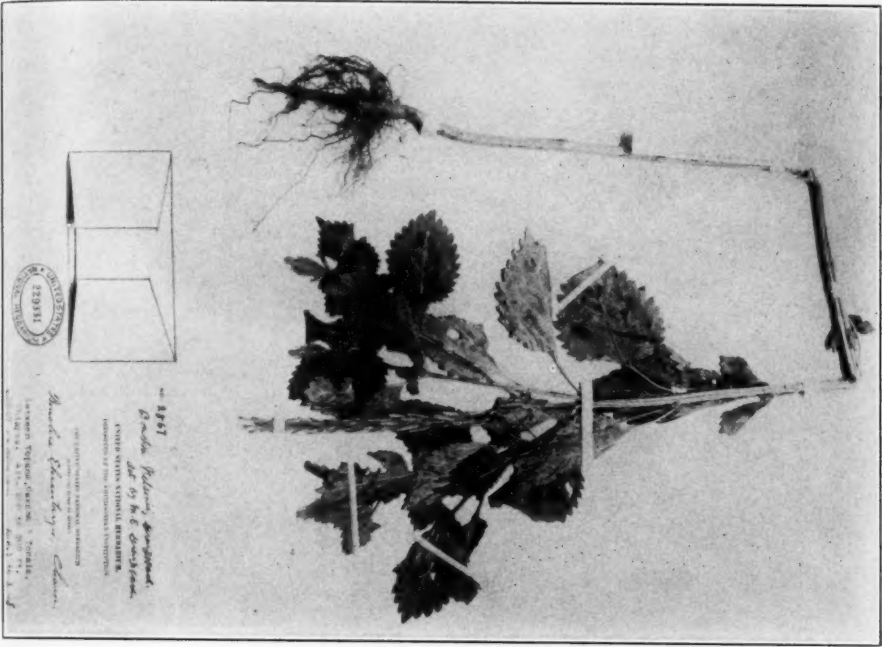
*Bouchea Nelsonii* Grenzebach

Southern Mexico and Guatemala

From the type specimen, *Nelson 2867*, in the United States National Herbarium.

## B

Fig. 13. Mature cocci within persistent calyx,  $\times 5$ .Fig. 14. Mature coccus, dorsal surface,  $\times 5$ .Fig. 15. Mature coccus, side view,  $\times 5$ .Fig. 16. Mature coccus, commissural surface,  $\times 5$ .



13



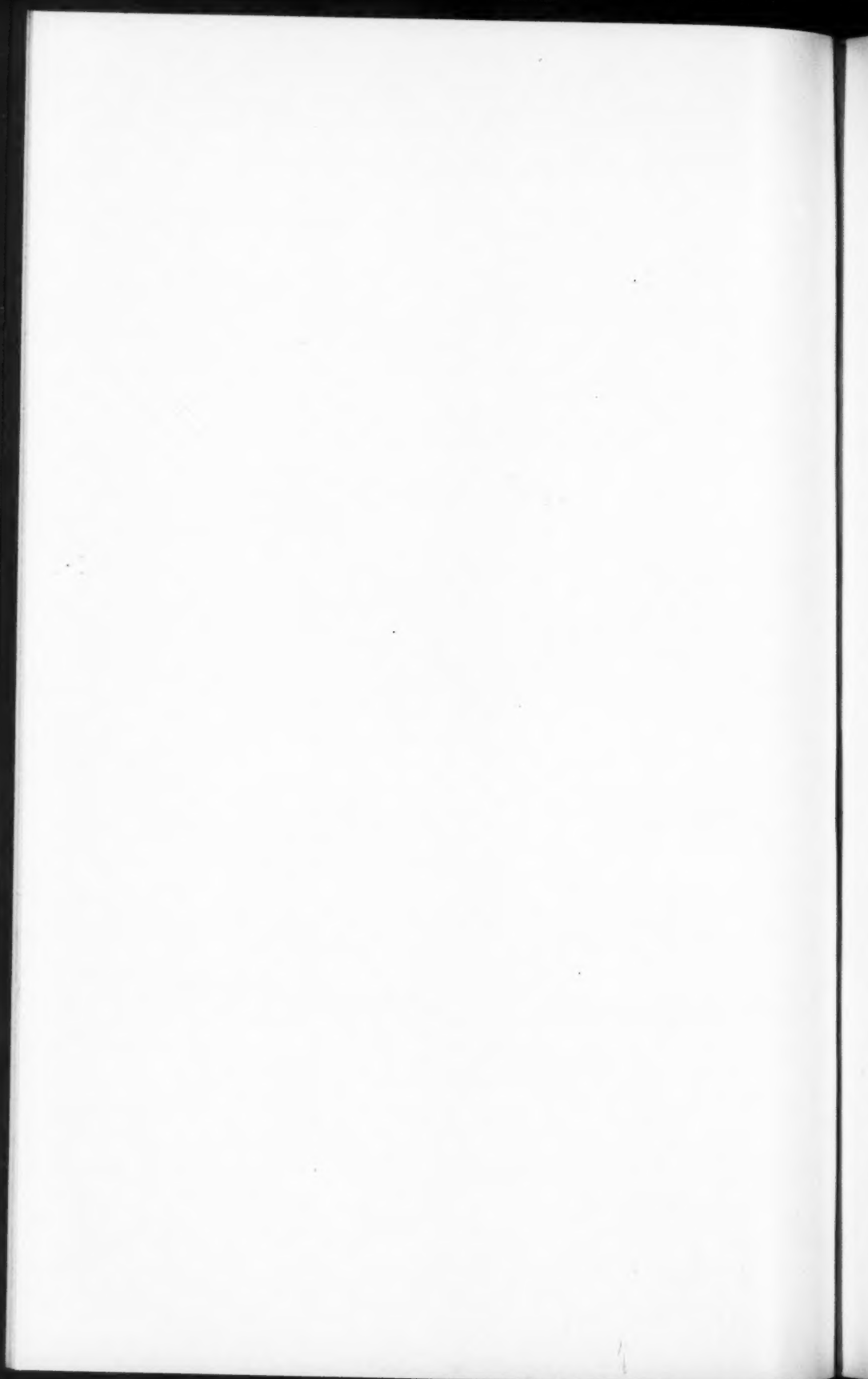
14



15



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## EXPLANATION OF PLATE

## PLATE 11

*Bouchea pseudogervaisii* (St. Hilaire) Cham.

Fig. 17. Mature cocci within persistent calyx,  $\times 5$ .

Fig. 18. Mature cocci, side view,  $\times 5$ .

Fig. 19. Mature coccus, dorsal surface,  $\times 5$ .

Fig. 20. Mature coccus, commissural surface,  $\times 5$ .

*Bouchea pseudogervaisii* (St. Hilaire) Cham. (showing the more attenuate character of the beak of the fruit)

Fig. 21. Mature cocci within persistent calyx,  $\times 5$ .

Fig. 22. Mature cocci, side view,  $\times 5$ .

Fig. 23. Mature coccus, dorsal surface,  $\times 5$ .

Fig. 24. Mature coccus, commissural surface,  $\times 5$ .

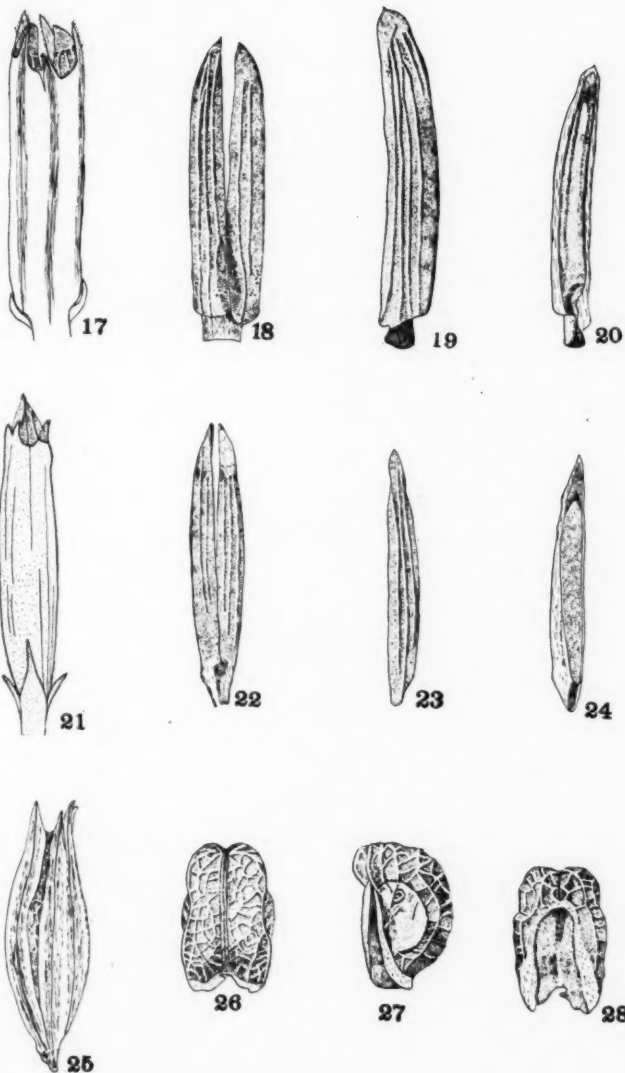
*Chascanum cernuum* Meyer

Fig. 25. Mature fruit within persistent calyx,  $\times 5$ .

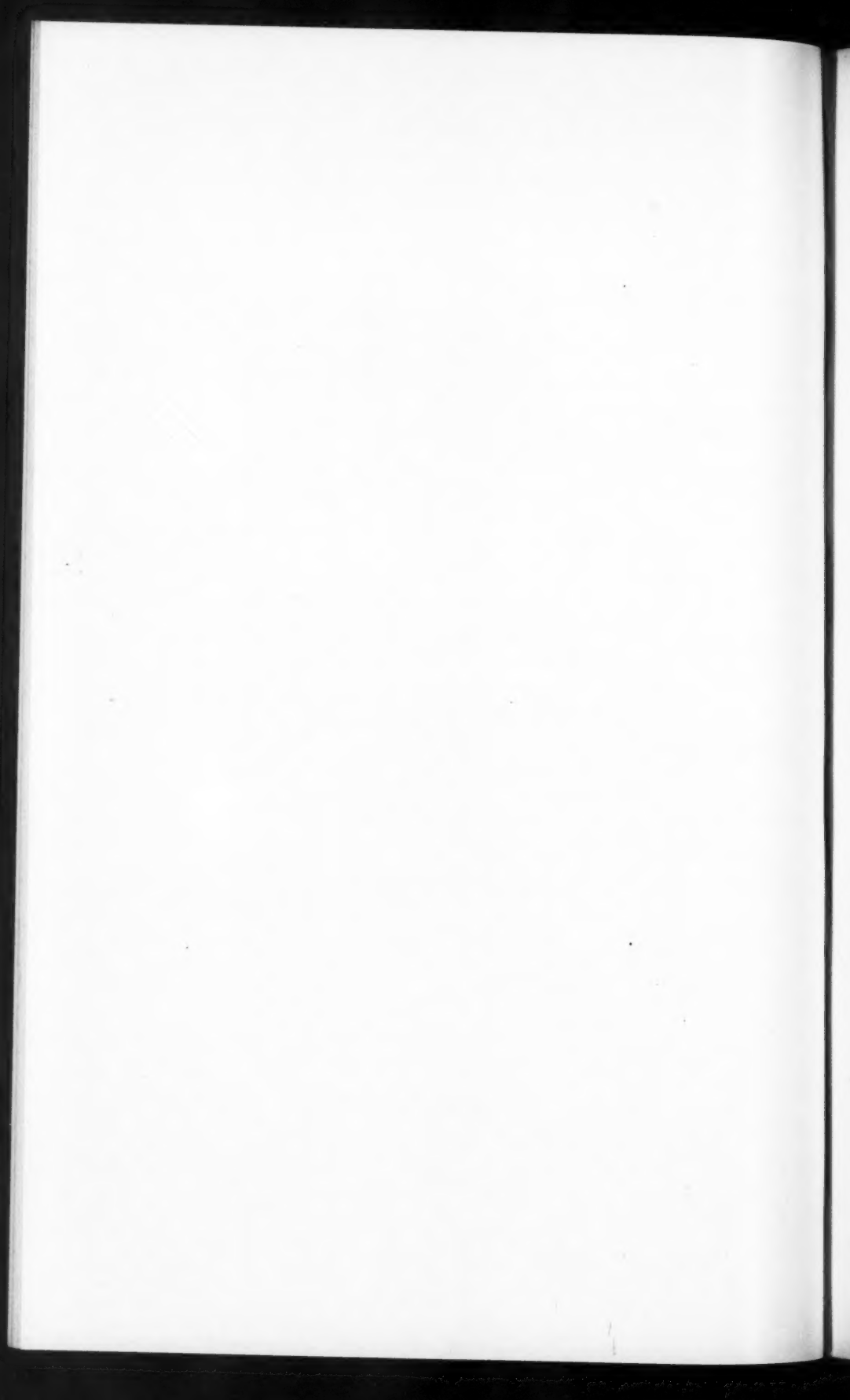
Fig. 26. Mature fruit, dorsal surface,  $\times 5$ .

Fig. 27. Mature fruit, side view,  $\times 5$ .

Fig. 28. Mature fruit, commissural surface,  $\times 5$ .



GRENZEBACH—REVISION OF BOUCHEA







## EXPLANATION OF PLATE

## PLATE 12

Open calyces.

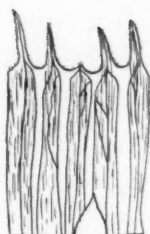
Fig. 29. *B. prismatica* (Jacq.) Kuntze,  $\times 5$ .

Fig. 30. *B. prismatica* var. *brevirostra*,  $\times 5$ .

Fig. 31. *B. Nelsonii* Grenzebach,  $\times 5$ .

Figs. 32, 33. *B. pseudogervad* (St. Hil.) Cham.,  $\times 5$ .

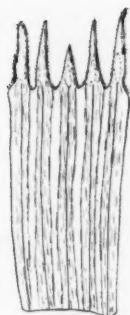
Fig. 34. *Chascanum cernuum* Meyer,  $\times 5$ .



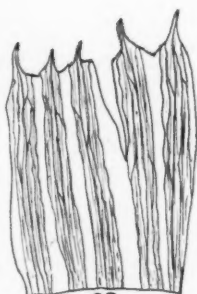
29



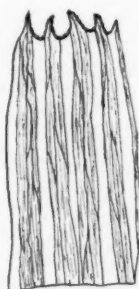
30



31



32



33



34

GRENZEBACH—REVISION OF BOUCHEA

